

SUBCHAPTER C : TECHNICAL STANDARDS

§334.41. Applicability.

(a) Except as provided under subsection (b) of this section, an underground storage tank (UST) shall be subject to all provisions of this subchapter if such tank meets the general applicability requirements of §334.1(b) of this title (relating to Purpose and Applicability).

(b) The provisions of this subchapter shall not apply to any of the following types of UST systems:

(1) In-ground hydraulic lifts which use a compressed air/hydraulic fluid system (regardless of size); and

(2) Any UST system which is covered under the partial exclusion provisions of §334.4(b) of this title (relating to Commission Exclusions).

(c) Any UST which is specifically excluded or exempted from the provisions of this subchapter under §334.41(b) of this title (relating to Applicability), but which is otherwise subject to any of the remaining provisions of this chapter, shall conform with the minimum design and operation requirements of §334.5(a) of this title (relating to General Prohibitions).

(d) For the purposes of this subchapter only, a new underground storage tank system (or new UST system) shall refer to any system for which installation has commenced on or after the effective date of this subchapter.

§334.42. General Standards.

(a) All components of any new or existing underground storage tank (UST) system subject to the provisions of this subchapter shall be designed, installed, and operated in a manner that will prevent releases of regulated substances due to structural failure or corrosion for as long as the UST system is used to store regulated substances.

(b) For all components of any new or existing UST system subject to the provisions of this subchapter which are used to contain or store a regulated substance, the surfaces of such components which are in direct contact with the regulated substance shall be constructed of or lined with materials that are compatible with the substance stored in such components. Any compatibility determination or analysis shall be in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(c) The owners and operators of UST systems subject to the provisions of this subchapter and those persons and/or business entities who engage in, perform, or supervise the installation, repair, or

removal of UST systems shall be responsible for ensuring that those UST systems are designed, installed, repaired, removed, and operated in accordance with the provisions of this subchapter, as provided under §334.11 and §334.12(b) of this title (relating to Enforcement and Other General Provisions).

(d) When provisions of this subchapter require compliance with a specific code or standard of practice developed by a nationally recognized association or independent testing laboratory, the most recent version of the referenced code in effect at the time of the regulated UST activity shall be applicable.

(e) Compliance with the provisions of this subchapter shall not relieve an owner or operator of a UST system from compliance with other applicable regulations legally developed by other governmental entities. (This requirement is more fully discussed in §334.12(a) of this title (relating to Other General Provisions)).

(f) Unless a variance or alternative procedure is approved by the executive director in accordance with §334.43 of this title (relating to Variances and Alternative Procedures), the requirements of this subchapter shall take precedence if and when such requirements are determined to be in conflict with any provisions contained in the following:

(1) any code or standard of practice developed by a nationally recognized association or independent testing laboratory; and

(2) the manufacturers' specifications and instructions for installation and operation of UST equipment.

(g) Any underground component of a UST system installed on or after September 29, 1989, shall be properly protected from corrosion by one or more of the allowable methods in §334.49(b) of this title (relating to Corrosion Protection).

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§334.43. Variances and Alternative Procedures.

(a) Prior to initiating any activity or procedure which is at variance with or which is not specifically authorized under this subchapter, the owner or operator of an underground storage tank (UST) system shall secure commission approval of the variance or alternative procedure in accordance with this section.

(b) The executive director shall have authority to review and approve requests for variances and alternative procedures as relate to the provisions of this subchapter. The executive director shall approve such requests only if the owner or operator can reasonably demonstrate that the proposed

variance or alternative procedure will result in a UST system that is no less protective of human health and safety and the environment than a system meeting the requirements of this subchapter.

(c) An owner or operator may submit a request for approval of a variance or alternative procedure when one or more of the following situations is applicable:

(1) when conformance with the requirements of this subchapter is considered either not practicable or not reasonable due to the type, design, capacity, material stored, or use of the UST system (e.g., bulk storage tanks, field-constructed tanks, and airport hydrant fuel distribution systems); or

(2) when new or alternative products, equipment, methods, and/or procedures appropriate for use with UST systems are not specifically authorized by the provisions of this subchapter.

(d) Any request to the executive director for approval of a variance or alternative procedure shall be made in writing, shall be signed and dated by the owner or operator, and shall be accompanied by the following additional documentation:

(1) written concurrence by the site or facility owner, if different from the tank owner;

(2) complete project identification, including:

(A) facility name, location, and UST facility identification number (if known);

(B) owner's name, address, and telephone number;

(C) name, address, and telephone number of owner's authorized representatives, (e.g., operator, contractor, or consultant); and

(D) proposed date for implementation of variance or alternative procedure;

(3) sufficient planning materials to describe or illustrate the variance or alternative procedure, such as:

(A) plans, drawings, and detail sheets (drawn to scale);

(B) design and construction specifications; and

(C) equipment manufacturers' specifications, operating instructions, and warranty information;

(4) sufficient documentation and supporting data to justify the reliability of the variance or proposed procedure, such as:

(A) results of tests or studies conducted by an equipment manufacturer, independent consultant, or nationally recognized association or independent testing laboratory; and

(B) results of previous experience involving the use of the alternative procedure or equipment;

(5) complete explanation of the reasons why the requested variance or proposed procedure is considered preferable to the methods or procedures specified in this subchapter, or why the methods or procedures specified in this subchapter are considered unreasonable or impracticable.

(6) adequate documentation to reasonably demonstrate that the proposed variance or alternative procedure will result in a UST system that is no less protective of human health and safety and the environment than a system meeting the requirements of this subchapter.

(e) Owners and operators shall maintain complete records of any requests for approval of any variances or alternative procedures, and documentation of the executive director's approval of such requests, for the operational life of the UST system, in accordance with §334.10(b) of this title (relating to Reporting and Recordkeeping).

§334.44. Implementation Schedules.

(a) New underground storage tank (UST) systems.

(1) Requirements for all new UST systems. All new UST systems installed on or after the effective date of this subchapter, which are used to store any regulated substances shall be in compliance with the following requirements from the time of installation through the operational life of the system.

(A) Such systems shall be designed, constructed, and installed in accordance with the provisions of §334.45 of this title (relating to Technical Standards for New UST Systems) and §334.46 of this title (relating to Installation Standards for New UST Systems).

(B) Such systems shall be properly protected from corrosion or equipped with appropriate corrosion protection equipment, as provided in §334.49 of this title (relating to Corrosion Protection).

(C) Such systems shall be monitored for releases as provided in §334.50 of this title (relating to Release Detection).

(D) The tanks in such systems shall be protected from spills and overfills, as provided in §334.51 of this title (relating to Spill and Overfill Prevention and Control).

(2) Additional requirements for new hazardous substance UST systems. In addition to the requirements applicable to all new UST systems in paragraph (1) of this subsection, all new hazardous substance UST systems installed on or after the effective date of this subchapter, shall also be in compliance with the following requirements from the time of installation through the entire operational life of the system.

(A) Such systems shall be properly constructed or equipped with a secondary containment system which shall be designed, constructed, and installed in accordance with the provisions of §334.45(d) of this title (relating to Technical Standards for New UST Systems) and §334.46(f) of this title (relating to Installation Standards for New UST Systems).

(B) Such systems shall be properly constructed or equipped with a release detection system capable of monitoring either the interstitial spaces between the primary and secondary walls of any double-wall UST components, or the spaces between the primary UST component walls and all secondary containment barriers, as applicable, in accordance with the provisions in §334.50(c) of this title (relating to Release Detection).

(b) Existing UST systems.

(1) Requirements for all existing UST systems. All existing UST systems (i.e., UST systems for which installation has commenced or has been completed on or prior to December 22, 1988) which are used to store any regulated substances shall meet the applicable requirements of §334.47 of this title (relating to Technical Standards for Existing UST Systems) in accordance with the following schedule:

(A) Tank integrity assessment and cathodic protection. No later than December 22, 1998, all existing UST systems shall be brought into compliance with the applicable tank integrity assessment and cathodic protection requirements of §334.47(b)(1) of this title (relating to Technical Standards for Existing UST Systems).

(B) Spill and overfill prevention. No later than December 22, 1994, all tanks in an existing UST system shall be brought into compliance with the applicable spill and overfill prevention equipment requirements of §334.51(b) of this title (relating to Spill and Overfill Prevention).

(C) Release detection for existing UST system piping.

(i) Release detection for pressurized piping. No later than December 22, 1990, all piping in an existing UST system that routinely conveys regulated substances under pressure (i.e., which operates at greater than atmospheric pressure) shall be brought into compliance with the pressurized piping release detection requirements in §334.50(b)(2)(A) of this title (relating to Release Detection).

(ii) Release detection for suction piping and gravity-flow piping. All piping in an existing UST system that routinely conveys regulated substances either by gravity flow or under suction (i.e., which operates at less than atmospheric pressure) shall be brought into compliance with the suction and gravity-flow piping release detection requirements in §334.50(b)(2)(B) of this title (relating to Release Detection) no later than the date on which release detection is required for the tank to which such piping is connected, as prescribed in subparagraph (D) of this paragraph.

(D) Release detection for existing tanks.

(i) Except as provided in clause (ii) of this subparagraph, all tanks in an existing UST system shall be brought into compliance with the tank release detection requirements in §334.50(b)(1) of this title (relating to Release Detection) no later than the date specified in the following subclauses for the time of installation applicable to such tanks:

(I) December 22, 1989, for tanks where the installation dates are undetermined or unknown;

(II) December 22, 1989, for tanks installed during 1964 or prior years;

(III) December 22, 1990, for tanks installed during the years 1965-1969, inclusive;

(IV) December 22, 1991, for tanks installed during the years 1970-1974, inclusive;

(V) December 22, 1992, for tanks installed during the years 1975-1979, inclusive;

(VI) December 22, 1993, for tanks installed during the years 1980-1987, inclusive; and

(VII) December 22, 1993, for tanks installed between January 1, 1988, and December 22, 1988, inclusive.

(ii) For emergency generator tanks only, the compliance dates prescribed in clause (i)(I)-(V) of this subparagraph shall be extended by one year; however, no compliance date shall be extended later than December 22, 1993.

(2) Additional requirements for existing hazardous substance UST systems. In addition to the requirements applicable to all existing UST systems in paragraph (1) of this subsection, all existing hazardous substance UST systems shall also be brought into compliance with additional secondary containment and release detection standards in accordance with the following schedule:

(A) No later than December 22, 1998, all existing hazardous substance UST systems shall be equipped with a secondary containment system meeting the design, construction, and installation requirements in §334.45(d) of this title (relating to Technical Standards for New UST Systems) and of §334.46(f) of this title (relating to Installation Standards for New UST Systems).

(B) No later than December 22, 1998, all existing hazardous substance UST systems shall be equipped with a release detection system capable of monitoring either the interstitial spaces between the primary and secondary walls of any double-walled UST components, or the spaces between the primary UST component walls and any secondary containment barriers, as applicable, in accordance with the provisions in §334.50(c) of this title (relating to Release Detection).

§334.45. Technical Standards for New Underground Storage Tank Systems.

(a) General requirements.

(1) Any new underground storage tank (UST) system installed on or after the effective date of this subchapter shall be in compliance with the provisions of this section during the entire operational life of the UST system.

(2) Any new UST system shall be designed, installed, and operated in a manner that will prevent releases due to structural failure or corrosion for the operational life of the UST system.

(3) The surfaces of all components of the new UST system which are in direct contact with a regulated substance shall be constructed of or lined with materials that are compatible with such regulated substances.

(4) All components of the new UST system which convey, contain, or store regulated substances shall be properly protected from corrosion in accordance with the applicable provisions in §334.49 of this title (relating to Corrosion Protection).

(5) All tanks, piping, and other ancillary equipment in a new UST system shall be installed in accordance with the requirements of §334.46 of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(b) Technical standards for new tanks.

(1) Tank design and construction. Each new tank shall be properly designed, constructed, and protected from corrosion in accordance with one or more of the methods listed in the following subparagraphs, and in accordance with specific codes and standards of practice developed by nationally recognized associations and independent testing laboratories, as referenced in the following subparagraphs.

(A) The tank may be constructed of fiberglass-reinforced plastic. Tanks constructed under this method shall meet one or more of the following standards:

(i) UL Standard 1316, "Standard for Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products;" or

(ii) ASTM Standard D 4021, "Standard Specification for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks."

(B) The tank may be constructed of coated steel and equipped with a factory-installed cathodic corrosion protection system. Any tank constructed under this method shall be thoroughly coated with a suitable dielectric material, shall be equipped with a factory-installed cathodic corrosion protection system meeting the appropriate design and operational requirements in §334.49(c)(1) of this title (relating to Corrosion Protection), and shall meet the following standards:

(i) UL Standard 58, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids;" and

(ii) Part I of UL Standard 1746, "Corrosion Protection Systems for Steel Underground Storage Tanks," or STI Standard, "Specification for sti-P₃ System of External Corrosion Protection of Underground Steel Storage Tanks."

(C) The tank may be constructed of coated steel and equipped with a field-installed cathodic corrosion protection system. Any tank constructed under this method shall be thoroughly coated with a suitable dielectric material, shall be equipped with a field-installed cathodic protection system meeting the appropriate design and operational requirements in §334.49(c)(2) of this title (relating to Corrosion Protection), and shall meet the following standards:

(i) UL Standard 58, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids;" and

(ii) NACE Standard, "Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems."

(D) The tank may be factory-constructed either as a steel/fiberglass-reinforced plastic composite tank, or as a steel tank with a bonded fiberglass-reinforced plastic external cladding. Any tank constructed under this method is not required to be equipped with a cathodic protection system, provided that the tank meets the following requirements.

(i) The tank shall be equipped with a factory-applied external cladding or laminate which has a total dry film thickness of 100 mils minimum and 125 mils nominal.

(ii) The tank shall be operated and maintained in accordance with the applicable requirements of §334.49 of this title (relating to Corrosion Protection).

(iii) The tank shall be designed and fabricated in accordance with one or more of the following standards:

(I) Part II of UL Standard 1746, "Corrosion Protection Systems for Steel Underground Storage Tanks;"

(II) ACT Specification ACT-100, "Fabrication of FRP Clad/Composite Underground Storage Tanks;" or

(III) any other UL standard applicable to composite UST.

(iv) The tank shall be electrically isolated from all other metallic structures by use of dielectric bushings or other appropriate methods.

(E) The tank may be designed, constructed, and protected from corrosion by an alternate method which has been reviewed and determined by the executive director to control corrosion and prevent the release or threatened release of any stored regulated substance in a manner that is no less protective of human health and safety and the environment than the methods described in subparagraphs (A)-(D) of this paragraph, in accordance with the procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(2) Spill and overfill prevention equipment. All new tanks shall be equipped with spill and overfill prevention equipment, in accordance with §334.51(b) of this title (relating to Spill and Overfill Prevention and Control).

(3) Release detection for new tanks. All new tanks shall be monitored for releases of regulated substances in accordance with §334.50 of this title (relating to Release Detection).

(4) Other new tank components.

(A) Fittings. All metallic tank fittings (e.g., bung hole plugs) shall be protected from corrosion and shall be either:

(i) isolated from the backfill material and groundwater; or

(ii) thoroughly coated with a suitable dielectric material, in accordance with the tank manufacturer's specifications; or

(iii) cathodically protected in accordance with the applicable provisions in §334.49(c) of this title (relating to Corrosion Protection).

(B) Striker plates. Factory-installed striker plates shall be located on the interior bottom surface of each tank under all fill and gauge openings.

(C) Dielectric bushings or fittings. In order to provide electrical isolation of the tank from other connected metal components, all coated steel tanks equipped with either a factory-installed cathodic protection system or a factory-applied fiberglass-reinforced plastic laminate or cladding shall also be fitted with dielectric bushings or fittings at each tank opening where other metal UST system components are connected, except for unused openings closed with metal plugs and for openings where the connected component is non-metallic.

(c) Technical standards for new piping.

(1) Piping design and construction. All new underground piping (including associated valves, fittings, and connectors) in a UST system shall be properly designed, constructed, and protected from corrosion in accordance with one of the methods listed in the following subparagraphs, and in accordance with specific codes and standards of practice developed by nationally recognized associations and independent testing laboratories, as referenced in the following subparagraphs.

(A) The piping may be constructed of fiberglass-reinforced plastic. Piping constructed under this method shall meet the following standards:

(i) UL Standard 971, "UL Listed Non-Metal Pipe;" and

(ii) UL Standard 567, "Pipe Connectors for Flammable and Combustible and LP Gas."

(B) The piping may be constructed of coated steel. Piping constructed under this method shall be thoroughly coated with a suitable dielectric material, shall be cathodically protected with a field-installed cathodic protection system meeting the appropriate design and operational requirements in §334.49(c) of this title (relating to Corrosion Protection), and shall meet the applicable provisions of the following standards:

(i) NFPA Standard 30, "Flammable and Combustible Liquids Code;"

(ii) API Publication 1615, "Installation of Underground Petroleum Storage Systems;"

(iii) API Publication 1632, "Cathodic Protection of Underground Storage Tanks and Piping Systems;" and

(iv) NACE Standard, "Control of External Corrosion on Submerged Metallic Piping Systems."

(C) The piping may be designed, constructed, and protected from corrosion by an alternate method which has been reviewed and determined by the executive director to prevent the release of any stored regulated substance in a manner that is no less protective of human health and the environment than the methods described in subparagraphs (A) and (B) of this paragraph. Any alternative methods must be submitted and approved in accordance with the procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(2) Release detection for new piping. All new piping shall be monitored for releases of regulated substances in accordance with §334.50(b)(2) of this title (relating to Release Detection).

(3) Other new piping components.

(A) For piping systems in which regulated substances are conveyed under pressure to an above-ground dispensing unit, a UL-listed (or approved equivalent) emergency shutoff valve (also called a shear or impact valve) shall be installed in each pressurized delivery or product line and shall be securely anchored at the base of the dispenser. This shutoff valve shall include a fusible link, and shall be designed to provide a positive shutoff of product flow in the event that a fire, collision, or other emergency occurs at the dispenser end of the pressurized line.

(B) UL-listed (or approved equivalent) flexible connectors shall be installed at both ends of each pressurized product or delivery line to provide flexibility and to allow for vertical and horizontal movement in the piping. The use of metal swing joints in a pressurized UST piping system is specifically prohibited.

(C) If buried and in contact with soil or backfill materials, all metallic pipe, valves, and fittings (including flexible connectors) shall be equipped with a cathodic protection system meeting the applicable requirements in §334.49(c) of this title (relating to Corrosion Protection).

(d) Secondary containment for UST systems.

(1) Applicability.

(A) A secondary containment system meeting the requirements of this subsection shall be installed as part of any hazardous substance UST system, in accordance with the applicable schedules in §334.44(a)(2) and (b)(2) of this title (relating to Implementation Schedules).

(B) A double-wall tank and piping system (or approved alternative) meeting the applicable requirements of this subchapter shall be installed for any UST system situated in the Edwards Aquifer recharge or transition zones, in accordance with Chapter 313 of this title (relating to Edwards Aquifer).

(C) The commission or the executive director may specifically require the installation of a secondary containment system meeting the requirements of this subsection at other times when necessary for the protection of human health or safety or the environment.

(2) General performance standards. All secondary containment systems installed as part of a UST system shall be:

(A) designed, installed, and operated in a manner that will prevent the release of regulated substances from such secondary containment system into the surrounding soil, backfill, groundwater, or surface water during the operational life of the UST system;

(B) capable of collecting and containing releases of regulated substances from any portion of the primary containment vessels (e.g., tanks and piping) until such released substances are removed;

(C) constructed of or lined with materials which are compatible with the stored regulated substance;

(D) constructed of materials having sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrological forces), physical contact with the stored regulated substance (and any other substance to which they may normally be exposed), climatic conditions, the stresses of installation, and the stresses of daily operation (including stresses from nearby vehicular traffic); and

(E) installed on a properly designed and properly placed bedding or backfill material which is capable of providing adequate support for the secondary containment system, capable of providing adequate resistance to any pressure gradients above and below the system, and capable of preventing failure due to settlement, compression, or uplift.

(3) Secondary containment for tanks. One or more of the following methods may be used to provide secondary containment for tanks.

(A) Double-wall tanks. Double-wall tanks may be used to comply with the secondary containment requirements of this subchapter, provided that such tanks shall meet the following additional provisions.

(i) The secondary wall of such double-wall tanks shall be structurally designed to contain and support the full-load capacity of the primary tank without failure.

(ii) The double-wall tank (including both the primary and secondary tank walls) shall be protected from corrosion in accordance with one or more of the allowable methods included in §334.49 of this title (relating to Corrosion Protection).

(iii) The double-wall tank shall be designed, installed, operated, and maintained in accordance with one of the applicable codes or standards of practice listed as follows:

(I) for fiberglass-reinforced plastic tanks: UL Standard 1316, "Standard for Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products" and ASTM Standard D 4021, "Standard Specification for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks;"

(II) for steel tanks: STI Standard, "Standard for Dual Wall Underground Steel Storage Tanks", UL Standard 58, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids", and other applicable UL standards for double-wall steel tanks; and

(III) any other code or standard of practice developed by a naturally recognized association or independent testing laboratory that has been reviewed and determined by the executive director to be no less protective of human health and safety, and the environment than the standards described in subclauses (I) and (II) of this clause, in accordance with procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(iv) The double-wall tank system shall be installed in accordance with the requirements in §334.46(f)(2) of this title (relating to Installation Standards for New UST Systems).

(B) External liners. Tank excavation liners may be used to comply with the secondary containment requirements of this paragraph, provided that such liners shall meet the following additional provisions.

(i) The tank excavation liner shall consist of an artificially-constructed material that is of sufficient strength, thickness, puncture-resistance, and impermeability (i.e., allow permeation at a rate of no more than 0.25 ounces per square foot per 24 hours for the stored regulated substance) in order to permit the collection and containment of any releases from the UST system. The criteria for evaluation of the liner for compliance with this clause shall be in accordance with accepted industry practices for materials testing. Types of liners which may be used include certain reinforced and unreinforced flexible-membrane liners, rigid fiberglass-reinforced plastic liners, and reinforced concrete vaults.

(ii) The liner shall be protected from corrosion in accordance with one or more of the allowable methods included in §334.49 of this title (relating to Corrosion Protection).

(iii) The liner shall be sufficiently compatible with the stored regulated substance, so that any regulated substance collected in the liner system shall not cause any substantial deterioration of the liner that would allow the regulated substances to be released into the environment.

(iv) The liner shall be designed to provide a containment volume of no less than 100 percent of the full capacity of the largest tank within its containment area.

(v) The liner shall be installed in accordance with the requirements in §334.46(f)(4) of this title (relating to Installation Standards for New UST Systems).

(4) Secondary containment for piping. One or more of the following methods shall be used to provide secondary containment for piping.

(A) Double-wall piping. Double-wall piping systems may be used to comply with the secondary containment requirements of this subchapter, provided that such piping systems meet the following additional provisions.

(i) The double-wall piping system shall be designed to contain a release from any portion of the primary piping within the secondary piping walls.

(ii) The double-wall piping system (including both the primary and secondary piping) shall be protected from corrosion in accordance with one or more of the allowable methods included in §334.49 of this title (relating to Corrosion Protection).

(iii) The double-wall piping system shall be designed, installed, and operated in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(iv) The double-wall piping system shall be installed in accordance with the requirements in §334.46(f)(3) of this title (relating to Installation Standards for New UST Systems).

(B) External liners. External piping trench liners may be used to comply with the secondary containment requirements of this paragraph, provided that such liners meet the additional provisions in paragraph (3)(B) of this subsection.

(e) Technical standards for other new UST system equipment.

(1) Vent lines. All underground portions of the vent lines (including all associated underground valves, fittings, and connectors) shall be designed and constructed in accordance with the piping requirements in subsection (c)(1) of this section, shall be properly protected from corrosion in accordance with one of the allowable methods in §334.49 of this title (relating to Corrosion Protection), and shall be installed in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(2) Fill pipes. All fill pipes (including any connected fittings) shall be:

(A) designed and constructed in accordance with the piping requirements in subsection (c)(1) of this section;

(B) properly protected from corrosion in accordance with one of the allowable methods in §334.49 of this title (relating to Corrosion Protection);

(C) properly enclosed in or equipped with spill and overfill prevention equipment as required in §334.51(b) of this title (relating to Spill and Overfill Prevention and Control); and

(D) equipped with a removable or permanent factory-constructed drop tube which shall extend to within 12 inches of the tank bottom.

(3) Release detection equipment. All release detection equipment shall be designed and constructed in accordance with the requirements for the particular type of equipment, as described in the applicable provisions in §334.50 of this title (relating to Release Detection).

(4) Monitoring wells and observation wells.

(A) All monitoring wells and observation wells installed on or after the effective date of this subchapter shall be designed, constructed, and installed in accordance with the requirements in §334.46(g) of this title (relating to Installation Standards for New UST Systems).

(B) Each separate tank hole in a new UST system installed on or after the effective date of this subchapter shall include a minimum number of four-inch diameter (nominal) observation wells, as specified in the following clauses:

(i) for a tank hole containing only one tank, a minimum of one observation well shall be required; and

(ii) for a tank hole containing two or more tanks, a minimum of two observation wells shall be required.

(f) Records for technical standards for new UST systems. Owners and operators of new UST systems shall maintain adequate records to demonstrate compliance with the applicable provisions in this section, which at a minimum, shall include all records required in §334.46(i) of this title (relating to Installation Standards for New Underground Storage Tank Systems). All records shall be maintained in accordance with §334.10(b) of this title (relating to Reporting and Recordkeeping).

§334.46. Installation Standards for New Underground Storage Tank Systems.

(a) General installation procedures. Any new underground storage tank (UST) system installed on or after the effective date of this subchapter shall be installed in compliance with the provisions of this section.

(1) Standards. All tanks, piping, and associated equipment shall be installed in accordance with at least one of the following standards, as applicable:

(A) PEI Publication RP-100, "Recommended Practices for Installation of Underground Liquid Storage Systems;"

(B) API Publication 1615, "Installation of Underground Petroleum Storage Systems;"

(C) ANSI Standard B31.3, "Petroleum Refinery Piping" and ANSI Standard B31.4, "Liquid Petroleum Transportation Systems;" or

(D) any other code or standard of practice developed by a nationally recognized association or independent testing laboratory that has been reviewed and determined by the executive director to be no less protective of human health and safety and the environment than the standards described in subparagraphs (A)-(C) of this paragraph, in accordance with the procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(2) Installation personnel. All tanks, piping, and associated equipment shall be installed by personnel possessing the appropriate skills, experience, competence, and, if applicable, any required certification or license to complete the installation in accordance with recognized industry practices and this chapter, and in a manner designed to minimize the possibility of UST system failures and the releases of regulated substances.

(3) Damages.

(A) All reasonable precautions shall be taken to prevent improper handling and damaging of the tanks and piping during the unloading and installation processes.

(B) Tanks and piping shall be physically inspected by the installer prior to installation.

(C) Any damage shall be repaired in accordance with the manufacturer's specifications; otherwise, damaged tanks and/or piping shall be replaced.

(4) Excavation.

(A) The tank excavation zone and piping trenches shall provide adequate vertical and horizontal space for the tanks, piping, and associated equipment, for the proper placement and compaction of bedding and backfill materials (particularly under the lower quadrant of the tank's circumference), and for adequate cover and paving to accommodate anticipated traffic loads.

(B) Tank excavation shall be performed in a manner that will avoid the undermining of foundations and other existing structures, and shall be constructed not less than three feet from the base of adjacent structures (unless specifically approved by a registered professional engineer) and not less than three feet from any underground utility easements and property lines.

(5) Bedding and backfill.

(A) The bedding and backfill shall consist of clean, washed, suitably-graded, and non-corrosive sand, crushed rock, or pea gravel.

(B) The bedding and backfill material shall be selected and placed in accordance with the tank and piping manufacturers' specifications, and shall be placed and compacted in uniform lifts, as appropriate, to assure proper support and protection of the tank and piping after installation.

(C) Minimum bedding and backfill requirements shall be in accordance with the applicable industry standard for the construction, as prescribed in subsection (a) of this section.

(D) The placement of tanks or piping directly on native soils, concrete pads or saddles, or any other underlayment except the bedding materials listed in this paragraph is specifically prohibited.

(b) Anchoring systems. Unless otherwise approved by the executive director in accordance with §334.43 of this title (relating to Variances and Alternative Procedures), all USTs located in areas subject to high water tables or flooding shall be protected from any floatation or movement which could jeopardize the integrity of the UST system.

(1) Methods to prevent tank flotation shall be in accordance with the tank manufacturer's specifications and shall be one (or a combination) of the following methods:

(A) the provision of ample backfill and/or paving on top of the tank to offset the buoyancy forces;

(B) the installation of a properly-designed deadman anchoring system, where the concrete beams shall be placed outside the vertical extension of the tank diameter and where the length of the beams shall extend at least one foot beyond the ends of the tank; or

(C) the installation of a properly-designed concrete hold-down pad anchoring system beneath the tank, where the pad's width and length shall extend at least one foot beyond the tank sides and ends in all directions.

(2) The installation of anchoring straps or cables shall be in accordance with the tank manufacturer's specifications. All parts of the straps, cables, and hardware shall be of corrosion-resistant material or, if metallic, shall be thoroughly coated or wrapped with a suitable dielectric material.

(c) Piping system installation.

(1) The piping layout shall be designed in a manner that will minimize the crossing of other lines and conduits, and the crossing of tanks and other UST system components. Where such crossing is unavoidable, adequate clearance shall be provided to prevent contact.

(2) Traps, sumps, or sags in the lines shall be avoided, and all piping shall slope at least $\frac{1}{8}$ inch per foot in the direction of the tank.

(3) All piping joints shall be accurately cut, deburred, cleaned, and sealed with appropriate piping sealant, bonding agent, or adhesive in accordance with the piping manufacturer's specifications so as to provide liquid-tight connections.

(d) Installation testing for new tanks and piping.

(1) Air testing of new tanks shall be conducted in accordance with the tank manufacturer's specifications. New tanks shall be air tested before they are installed.

(A) Air testing for single-wall tanks shall include the soaping of all surfaces, seams, and fittings, pressurizing and gauging with three to five psig air pressure for at least one hour, monitoring the gauge for pressure drops, and inspecting for bubbles.

(B) Air testing for double-wall tanks shall be in accordance with §334.46(f)(2)(B) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(C) Gauges used in air testing procedures shall have a maximum range not exceeding 15 psig. All tanks undergoing air pressure testing shall be equipped with a pressure relief device capable of relieving the total output of the compressed-air source at a pressure of not more than six psig.

(2) Air testing of new piping, fittings, and valves shall be conducted in accordance with the manufacturer's specifications. New piping shall be tested before being covered and placed into use. Air testing of piping shall include the soaping of all joints, pressurizing with compressed air to

150% of the maximum piping operating pressure, or a minimum of 50 psig, for at least one hour, and inspecting for bubbles. Air testing for secondary containment piping shall be in accordance with subsection (f)(3)(B) of this section.

(3) In addition to the air tests, a tank tightness test and a piping tightness test meeting the requirements of §334.50(d)(1)(A) and (b)(2)(A)(ii)(I), respectively, of this title (relating to Release Detection) shall be performed after the backfill has been placed but prior to bringing the new UST system into operation.

(4) Additional tests required. In addition to the air tests and tightness tests required in this subsection, the following additional installation tests shall be required, as applicable.

(A) For fiberglass-reinforced plastic tanks, the tank diameter shall be accurately measured prior to and after installation to ascertain the amount of vertical deflection, as specified in the tank manufacturer's installation procedures. Except when specifically authorized in writing by an authorized representative of the tank manufacturer, tanks shall not be placed into operation if the measured vertical deflection exceeds the manufacturer's maximum allowable deflection ratings.

(B) For tanks which are factory constructed as either steel/fiberglass-reinforced plastic composite tanks or for steel tanks with a bonded fiberglass-reinforced plastic external cladding, an appropriate test shall be conducted by a qualified corrosion technician or qualified corrosion specialist to ensure that the steel tank shell remains electrically isolated from the surrounding soil, backfill, groundwater, and other metal components.

(i) Such test shall be performed after the tank installation is completed but prior to placing the tank into operation, and shall be conducted by taking structure to soil voltage readings in accordance with procedures established by a code or standard of practice developed by a nationally-recognized association or independent testing laboratory.

(ii) If the test indicates that the steel tank shell is no longer electrically isolated, a qualified corrosion specialist shall review the test results and thoroughly inspect the area of the tank installation to ascertain the extent of electrical isolation and corrosion protection for the steel tank shell.

(iii) If the qualified corrosion specialist determines that the steel tank shell is no longer adequately protected from corrosion, then the owner or operator shall assure that one or more of the following procedures are completed before the tank is placed into operation:

(I) appropriate repairs or modifications shall be made to restore the electrical isolation of the steel tank shell; or

(II) a field-installed cathodic protection system shall be installed in accordance with the requirements in §334.49(c)(2) of this title (relating to Corrosion Protection).

(C) For steel tanks and other UST system components which are equipped with factory-installed or field-installed cathodic corrosion protection systems, the cathodic protection systems shall be tested for operability and adequacy of protection by a qualified corrosion technician or qualified corrosion specialist after the UST system installation is completed but prior to placing the system into operation.

(i) If the test indicates that the cathodic protection system is inoperable or inadequate, a qualified corrosion specialist shall review the test results and thoroughly inspect the UST system to ascertain the extent of corrosion protection.

(ii) If the qualified corrosion specialist determines that the UST system component is no longer adequately protected from corrosion, then the owner or operator shall assure that one or more of the following procedures are completed before the UST system is placed into operation.

(I) Appropriate repairs or modifications shall be made to restore the cathodic corrosion protection to the applicable UST system components.

(II) The cathodic protection system shall be replaced with another operable cathodic protection system which will provide adequate corrosion protection to the applicable UST system components, in accordance with the requirements in §334.49(c)(2) of this title (relating to Corrosion Protection).

(e) Installation of cathodic protection systems. The installation of any field-installed cathodic protection system in a new or existing UST system shall be in accordance with the applicable requirements of §334.49(c)(2) of this title (relating to Corrosion Protection).

(f) Installation of secondary containment systems.

(1) Secondary containment. Any secondary containment system shall meet the technical standards of §334.45(d) of this title (relating to Technical Standards for New Underground Storage Tank Systems).

(2) Installation of double-wall tanks.

(A) The installation of double-wall tanks shall be in compliance with the manufacturer's specifications and the applicable tank installation procedures in this section.

(B) Air testing for double-wall tanks shall be in accordance with the manufacturer's specifications and the following procedures.

(i) The primary tank shall be pressurized and gauged with three to five psig of air pressure. The primary tank shall be pressurized for at least one hour, and the gauge pressure shall be periodically monitored for any pressure drops.

(ii) After disconnecting the outside air pressure source, the interstitial area between the tank walls shall be pressurized with air pressure from the primary tank. A second gauge shall be used to measure the pressure in the interstitial space.

(iii) The exterior of the tank shall be soaped, and the integrity of the system shall be inspected by monitoring the gauges and inspecting for air bubbles for at least one hour prior to releasing the pressure.

(iv) Gauges used in air testing procedures shall have a maximum range not exceeding 15 psig. All tanks undergoing air testing shall be equipped with a pressure relief device capable of relieving the total output of the compressed-air source at a pressure of not more than six psig.

(3) Installation of double-wall piping.

(A) The installation of double-wall piping shall be in compliance with the manufacturer's specifications and the applicable piping installation procedures in this section.

(B) After successful air testing of the completed primary piping system (in accordance with subsection (d)(2) of this section), the secondary containment piping shall be air tested in accordance with the manufacturer's specifications and the following procedures.

(i) The secondary containment piping shall be pressurized and gauged with three to five psig of air pressure.

(ii) The exterior of the secondary containment piping shall be soaped and the integrity of the system shall be inspected by monitoring for air bubbles for at least one hour.

(iii) The secondary containment piping system shall remain pressurized, and the gauges shall be periodically monitored for pressure losses, until the entire UST system installation is complete in order to monitor for damages during the remaining construction activities.

(4) Installation of external liners.

(A) External liners shall be installed in accordance with the manufacturer's specifications, and in accordance with the requirements in this paragraph.

(B) The installation, field-seaming, and field-repair of any liners shall be performed only by qualified personnel who have been properly trained and certified by the liner manufacturer.

(C) The liner shall be protected from puncture, abrasion, or any other damage during placement and during installation of other UST system components. A protective layer of puncture-resistant filter fabric shall be required when the liner is placed in an excavation area where the presence of sharp paving, rocks, or other debris presents a threat to the liner integrity.

(D) The liner shall be installed in a manner that will allow sufficient enclosure of the secondarily-protected component to prevent lateral and vertical migration of any collected regulated substances.

(E) For UST systems which are equipped with cathodic protection equipment, the liner shall be installed so as not to jeopardize or inhibit the proper operation of such cathodic protection equipment.

(F) The liner installation shall include the provision of an appropriate number of recessed collection/detection points, and all portions of the liner shall be sloped toward such points to permit the detection of any releases from the primary storage component.

(G) The installation of the liner shall be performed in a manner that will ensure that groundwater, soil moisture, and stormwater runoff will not adversely affect the liner's ability to collect and contain regulated substances or the ability of the selected release detection methods to operate effectively.

(H) The liner shall be designed and installed to ensure that it will always be situated above the highest groundwater level and outside the 25-year flood plain, unless the liner and the release detection system are properly designed for use under such conditions. The owner or operator may be required to provide documentation of the methods used to determine groundwater and floodplain information.

(I) After completion of the liner installation, but prior to placing the UST system into service, the liner shall be properly tested in accordance with the manufacturer's specifications.

(g) Installation of monitoring wells and observation wells. All monitoring wells and observation wells installed in conjunction with a UST system on or after the effective date of this subchapter shall be constructed and installed in accordance with the requirements of this paragraph.

(1) General requirements for both monitoring wells and observation wells.

(A) All monitoring wells and observation wells shall be constructed or installed by personnel possessing the appropriate skills, experience, competence and, if applicable, any required license or certification to complete the construction or installation in accordance with recognized industry standards and the requirements of this subsection.

(B) Except for observation wells installed pursuant to §334.45(e)(4)(B) of this title (relating to Technical Standards for New Underground Storage Tank Systems), the determination of the appropriate number and the appropriate diameters of monitoring wells or observation wells shall be based on the planned purpose of such well and on the specific procedures, methods, and equipment to be utilized in achieving such purpose.

(C) The slotted or screened portion of the monitoring well or observation well casing shall be designed and sized so as to prevent the migration of natural soils, backfill material, or filter pack material into the well, and to allow the unrestricted entry of any released regulated substances (liquid-phase or vapor-phase, as applicable) into the well at all times, regardless of the groundwater levels.

(D) The well casing material shall be sufficiently compatible with the stored regulated substance such that prolonged exposure to such substances will not cause failure or excessive deterioration of the casing.

(E) When installed or constructed for the purposes of compliance with one or more of the release detection methods in §334.50(d) of this title (relating to Release Detection), the specific number and positioning of the monitoring wells and/or observation wells shall be based on the results of an assessment of the underground areas within and immediately surrounding the UST system excavation zone to assure compliance with the specific criteria and requirements for the applicable release detection method. Such assessment shall be performed by qualified personnel who are familiar with the characteristics of the stored regulated substance and the groundwater, soil, and geologic conditions at the site.

(F) All monitoring wells and observation wells shall be equipped with a properly-designed and properly-installed bottom cap.

(G) All monitoring well and observation well installations shall include an appropriate access vault or manhole, which shall be equipped with a liquid-tight cover and be designed to divert surface runoff away from the well.

(H) All monitoring wells and observation wells shall be properly capped, labeled, and secured (or locked) to prevent unauthorized access, tampering, and any deliberate or accidental depositing of unauthorized substances.

(2) Additional requirements for monitoring wells. In addition to the general requirements of paragraph (1) of this subsection, all monitoring wells installed in conjunction with a UST system shall be constructed or installed in accordance with the applicable requirements of Chapter 287 of this title (relating to Water Well Drillers) and the Water Well Drillers Act (Texas Civil Statutes, Article 7621e, Water Auxiliary Laws), and any person constructing or installing a monitoring well shall be appropriately licensed as required therein.

(3) Additional requirements for observation wells. In addition to the general requirements of paragraph (1) of this subsection, the following requirements shall be applicable to all observation wells installed in conjunction with a UST system.

(A) All observation wells that are regulated as monitoring wells by the Water Well Drillers Board shall be constructed or installed in accordance with the applicable requirements in Chapter 287 of this title (relating to Water Well Drillers) and the Water Well Drillers Act (Texas Civil Statutes, Article 7621e, Water Auxiliary Laws), and any person constructing or installing such well shall be appropriately licensed as required therein.

(B) All observation wells that are not regulated as monitoring wells by the Water Well Drillers Board shall be constructed or installed in accordance with the following minimum requirements.

(i) All observation wells shall be designed and installed in general accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(ii) All observation wells shall be constructed or installed within the UST system excavation zone, and shall be completed to a depth of at least two feet below the lowest part of any monitored tank, or at least one foot below the lowest part of any monitored piping, as applicable.

(iii) For observation wells installed or constructed on or after the effective date of this subchapter in a new or existing UST system where the backfill consists of specialized or select materials (i.e., sand, pea gravel, or crushed rock), the following minimum requirements shall be applicable:

(I) The access vault or manhole shall be properly installed in a concrete encasement which shall extend from the top of the vault to at least one foot below the base of the vault to provide adequate structural support and to prevent surface runoff and pollutants from entering the well.

(II) Beginning at the bottom of the concrete encasement beneath the access vault, the well casing shall be properly sealed with impervious bentonite or a similar

impervious material for a minimum distance of either one foot below the bottom of the concrete encasement or to the top of the specialized or select backfill material, whichever is the greater depth.

(iv) For observation wells installed or constructed on or after the effective date of this subchapter in an existing UST system where the backfill consists of materials other than specialized or select materials (e.g., native soils), the well shall be constructed or installed in accordance with the applicable standards in Chapter 287 of this title (relating to Water Well Drillers). If the observation well is not regulated as a monitoring well by the Water Well Drillers Board, the licensing requirements for persons constructing or installing such well shall not be applicable.

(h) Certification of installation.

(1) All owners and operators of new UST systems installed on or after the effective date of this subchapter shall ensure that the installation was completed in accordance with the provisions of this section, and that the following certification criteria applicable to the installation are met.

(A) For all UST system installations commencing on or after the effective date of this subchapter but before February 1, 1990, the owner or operator shall assure that at least one of the following criteria is met:

(i) the installer of the UST system has been properly certified by the tank, piping, and equipment manufacturers;

(ii) the installation has been inspected and certified by a registered professional engineer with appropriate training and experience in UST system installation procedures;

(iii) all construction and installation activities listed in the equipment manufacturers' checklists have been properly completed; or

(iv) the installation activities have been reviewed and determined by the executive director to prevent releases in a manner that is no less protective of human health and the environment than the methods described in clauses (i)-(iii) of this subparagraph. Any alternative methods must be submitted and approved in accordance with the procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(B) For all UST system installations commencing on or after February 1, 1990, the owner or operator shall assure that the UST system installation is conducted by an installer licensed by the commission.

(2) The owner and the installer of the UST system shall complete the installation certification section of the commission's authorized tank registration form, and shall certify by

signature that the installation methods are in compliance with the provisions of this section, as required by §334.8(a) of this title (relating to Certification).

(i) Installation records.

(1) Owners and operators shall maintain all installation records required in accordance with the requirements in §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) Owners and operators shall maintain the following records for the operational life of the UST system:

(A) general information relating to the installation activity, including:

(i) date of installation activity;

(ii) names, addresses, and telephone numbers of the persons conducting the installation and performing any associated inspections or testing; and

(iii) copies of all related notifications or reports filed with the commission or others, including:

(I) registration information, as required by §334.7 of this title (relating to Registration); and

(II) installation certification information, as required by §334.8(a) of this title (relating to Certification);

(B) as-built drawings (or plans), which have been drawn to scale and in sufficient detail to accurately depict and describe the sizes, dimensions, and locations of the following:

(i) all pertinent site features, including property boundaries, street and road rights-of-way, easements, and utility lines, buildings and other structures, driveways, slabs, and any natural features;

(ii) all pertinent UST system components, including tanks, piping, vent piping, pumps, dispensers, excavation zone (including tank hole and piping trench), monitoring wells, spill and overfill prevention equipment, release detection system components (including monitoring and testing locations), cathodic protection system components (including test stations), secondary containment systems, anchoring systems, and any other pertinent UST system components; and

(iii) any site features or UST system components which have been added, revised, changed, modified, or removed subsequent to the preparation of the original drawings or plans.

(C) equipment information for all UST system components including:

(i) manufacturers' specifications, installation instructions, operating instruction, warranty information, recommended test procedures, and inspection and maintenance schedules; and

(ii) names, addresses, and telephone numbers of the manufacturers' representatives and local authorized service technicians.

(3) Owners and operators shall maintain the results of all equipment tests, including the air tests and the tightness tests conducted on the tanks and piping at the time of installation, for at least five years after the date of installation.

§334.47. Technical Standards for Existing Underground Storage Tank Systems.

(a) General requirements.

(1) Alternatives for existing underground storage tank (UST) systems. No later than the implementation dates specified in §334.44(b) of this title (relating to Implementation Schedules), all applicable components of any existing UST system (i.e., UST system for which installation has commenced or has been completed on or prior to December 22, 1988) shall be either installed, upgraded, improved, or replaced with equipment or components which meet or exceed either of the following requirements:

(A) the requirements for technical standards and installation of new UST systems in §334.45 of this title (relating to Technical Standards for New Underground Storage Tank Systems) and in §334.46 of this title (relating to Installation Standards for New Underground Storage Tank Systems); or

(B) the minimum upgrading requirements for existing UST systems in subsection (b) of this section.

(2) If any applicable component of an existing UST system is not brought into timely compliance with the requirements of paragraph (1) of this subsection, the UST system shall be permanently removed from service no later than 60 days after the prescribed implementation date. The permanent removal from service shall be conducted in accordance with the applicable provisions of §334.55 of this title (relating to Permanent Removal From Service).

(b) Minimum upgrading requirements for all existing UST systems.

(1) Tank integrity assessment and UST system cathodic protection. No later than December 22, 1998, all tanks in an existing UST system shall be assessed for structural integrity, and

all underground metallic components of an existing UST system shall be equipped with a cathodic protection system, as provided in the following subparagraphs.

(A) Tank integrity assessment. The tank shall be assessed for structural integrity and for the presence of corrosion holes by one or more of the following methods.

(i) The tank may be equipped with one or more of the release detection systems meeting the applicable requirements of §334.50(d)(4)-(9) of this title (relating to Release Detection). Such release detection system(s) shall have been in operation for at least 60 days prior to the date of the cathodic protection system installation, and at least one of the systems shall remain in operation for the remaining operational life of the tank.

(ii) The tank may be tested by conducting at least two tank tightness tests meeting the requirements of §334.50(d)(1)(A) of this title (relating to Release Detection). The first tightness test shall be conducted prior to installing the cathodic protection system, and the second test shall be conducted between three and six months after the cathodic protection system is placed into operation.

(iii) When the tank upgrading is to include the installation of an interior lining meeting the applicable provisions in §334.52(b) of this title (relating to Underground Storage Tank System Repairs and Relining), a site assessment or release determination may be conducted prior to the installation of the interior lining and the cathodic protection system. Such site assessment or release determination shall be conducted in accordance with the provisions of §334.55(e) of this title (relating to Permanent Removal from Service).

(iv) Prior to the installation of the cathodic protection system, the tank may be internally inspected and assessed to assure that the tank is structurally sound and free of corrosion holes, provided that such internal inspection shall be:

(I) conducted in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory; and

(II) performed by qualified personnel possessing the requisite training, experience, and competence to assure that any corrosion holes or structurally unsound areas are located.

(v) Prior to the installation of the cathodic protection system, the tank may be assessed for structural integrity and the presence of corrosion holes by an alternate method which has been reviewed and determined by the executive director to prevent releases in a manner that is no less protective of human health and the environment than the methods described in clauses (i)-(iv) of this subparagraph, in accordance with the provisions of §334.43 of this title (relating to Variances and Alternative Procedures).

(B) Repairs or corrective action. If the results of the tank integrity assessment (required by subparagraph (A) of this paragraph) indicate that the existing tank is not structurally sound and/or that a release of regulated substances has occurred, then the owner and operator shall:

(i) comply with the applicable release reporting, investigation, and corrective action requirements of Subchapter D of this chapter (relating to Release Reporting and Corrective Action); and

(ii) conduct one of the following activities, as applicable:

(I) perform appropriate repairs or relining of the tank, in accordance with the applicable requirements of §334.52 of this title (relating to Underground Storage Tank System Repairs and Relining), as necessary to restore the structural integrity of the tank; or

(II) permanently remove the tank from service in accordance with the applicable provisions in §334.55 of this title (relating to Permanent Removal from Service).

(C) Field-installed cathodic protection system. After confirmation or restoration of the structural integrity of the tank, all underground metal components of the underground storage tank system, which are not isolated from the surrounding soil, backfill, and groundwater, and which either do or could convey, contain, or store regulated substances, shall be equipped with a field-installed cathodic protection system meeting the requirements of §334.49(c)(2) of this title (relating to Corrosion Protection).

(2) Adding spill and overfill prevention equipment. No later than December 22, 1994, all existing USTs shall be equipped with appropriate spill and overfill prevention equipment, in accordance with the provisions in §334.51(b) of this title (relating to Spill and Overfill Prevention and Control).

(3) Adding release detection for UST system piping.

(A) Release detection for pressurized piping. No later than December 22, 1990, all piping in an existing UST system that routinely conveys regulated substances under pressure (i.e., which operates at greater than atmospheric pressure) shall be brought into compliance with the pressurized piping release detection requirements in §334.50(b)(2)(A) of this title (relating to Release Detection).

(B) Release detection for suction piping and gravity-flow piping. All piping in an existing UST system that routinely conveys regulated substances either under suction (i.e., which operates at less than atmospheric pressure) or by gravity-flow shall be brought into compliance with the applicable release detection requirements in §334.50(b)(2)(B) of this title (relating to Release Detection) no later than the date on which release detection is required for the tank to which such piping is connected, as prescribed in paragraph (4) of this subsection.

(4) Adding release detection for tanks.

(A) Except as provided in subparagraph (B) of this paragraph, all tanks at an existing UST system shall be brought into compliance with the tank release detection requirements in §334.50(b)(1) of this title (relating to Release Detection) no later than the date specified in the following clauses for the time of installation applicable to such tanks:

- (i) December 22, 1989, for tanks where the installation dates are undetermined or unknown;
- (ii) December 22, 1989, for tanks installed during 1964 or prior years;
- (iii) December 22, 1990, for tanks installed during the years 1965 through 1969, inclusive;
- (iv) December 22, 1991, for tanks installed during the years 1970 through 1974, inclusive;
- (v) December 22, 1992, for tanks installed during the years 1975 through 1979, inclusive;
- (vi) December 22, 1993, for tanks installed during the years 1980 through 1987, inclusive; and
- (vii) December 22, 1993, for tanks installed between January 1, 1988, and December 22, 1988, inclusive.

(B) For emergency generator tanks only, the compliance dates prescribed in subparagraph (A)(i)-(v) of this paragraph shall be extended by one year; however, no compliance date shall be extended past December 22, 1993.

(C) When two or more existing tanks are located in a common tank hole, and when the selected method of release detection is either vapor monitoring or groundwater monitoring in accordance with §334.50(d)(5) and (6) of this title (relating to Release Detection), then all such tanks shall be brought into compliance with the applicable release detection requirements of this paragraph no later than the date specified for the oldest tank in such common tank hole.

(c) Additional upgrading requirements for existing hazardous substance UST systems. In addition to the upgrading requirements applicable to all existing UST systems in subsections (a) and (b) of this section, all existing hazardous substance UST systems (i.e., UST system for which installation has commenced or has been completed on or prior to December 22, 1988) shall be equipped or retrofitted with a secondary containment system and an associated release detection system in accordance with the following provisions:

(1) No later than December 22, 1998, all existing hazardous substance UST systems shall be equipped with a secondary containment system meeting the design, construction, and installation requirements in §334.45(d) of this title (relating to Technical Standards for New Underground Storage Tank Systems) and §334.46(f) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(2) No later than December 22, 1998, all existing hazardous substance UST systems shall be equipped with a release detection system capable of monitoring either the interstitial spaces between the primary and secondary walls of any double-walled UST component, or the spaces between the primary UST component walls and any external liners, as applicable, in accordance with the provisions in §334.50(c) of this title (relating to Release Detection).

(d) Records for upgrading of existing UST systems.

(1) Owners and operators shall maintain all records related to the upgrading of existing UST systems required in this subsection in accordance with the requirements in §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) Owners and operators shall maintain the following records for the operational life of the UST system:

(A) general information related to the tank integrity assessment and cathodic protection requirements in subsection (b) of this section, including:

(i) dates of the tank integrity assessment and cathodic protection installation activities;

(ii) names, addresses, and telephone numbers of the persons conducting the tank integrity assessment and cathodic protection installation activities; and

(iii) copies of all related notifications or reports filed with the commission or others, including:

(I) registration information, as required by §334.7 of this title (relating to Registration); and

(II) installation certification information, as required by §334.8(a) of this title (relating to Certification);

(B) as-built drawings (or plans), which have been drawn to scale and in sufficient detail so as to accurately depict and describe the sizes, dimensions, and locations of any UST system components or equipment added or installed on or after the effective date of this subchapter

which are installed pursuant to one of the construction activities included in §334.6(b)(1)(A) of this title (relating to Construction Notification);

(C) equipment information for any UST system components or equipment added or installed on or after the effective date of this subchapter for the purpose of compliance with the upgrading requirements of this section, including manufacturers' specifications, installation instructions, operating instructions, warranty information, recommended test procedures, and inspection and maintenance schedules.

(3) Owners and operators shall maintain the results of all equipment tests and tank integrity tests required in this section including internal inspections, tank and piping tightness tests, and site assessments, for at least five years after the dates such tests are conducted.

§334.48. General Operating and Management Requirements.

(a) Prevention of releases. All owners and operators of underground storage tank (UST) systems shall ensure that the systems are operated, maintained, and managed in a manner that will prevent releases of regulated substances from such systems.

(b) UST system management. UST systems shall be operated, maintained, and managed in accordance with accepted industry practices.

(c) Inventory control. On or after the effective date of this subchapter, regardless of which method of release detection is used for compliance with §334.50 of this title (relating to Release Detection), effective manual or automatic inventory control procedures shall be conducted for all UST systems at retail service stations where petroleum substances used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and where such dispensing is an act of retail sale. Such inventory control procedures shall be in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory. Complete and accurate inventory records shall be maintained in accordance with §334.10 of this title (relating to Reporting and Recordkeeping).

(d) Spill and overfill control. All owners and operators shall ensure that spills and overfills of regulated substances do not occur and that all spill and overfill prevention equipment is properly operated and maintained in accordance with §334.51 of this title (relating to Spill and Overfill Prevention and Control).

(e) Operational requirements for release detection equipment. Owners and operators of all new and existing UST systems shall ensure that all release detection equipment installed as part of an UST system pursuant to §334.50 of this title (relating to Release Detection) is maintained in good operating condition. The owner or operator shall also assure that such equipment is routinely inspected and serviced in accordance with the manufacturer's specifications and in a manner that will assure the proper performance, operability, and running condition of the equipment. Where periodic testing

and/or monitoring activities are required as part of a specific release detection method under §334.50 of this title (relating to Release Detection), such tests and/or monitoring activities shall be performed at the prescribed times and/or frequencies.

(f) Operation requirements for corrosion protection systems. All owners and operators of UST systems shall assure that all required UST system components are continuously protected from corrosion, and that all corrosion protection systems are inspected and tested, in accordance with the applicable provisions of §334.49 of this title (relating to Corrosion Protection).

(g) Operation and maintenance records. Owners and operators shall maintain records relating to the operation and maintenance of an UST system (including records related to inspection, servicing, testing, and inventory control) as prescribed in this section for at least five years, and such records shall be maintained in accordance with §334.10(b) of this title (relating to Reporting and Recordkeeping).

§334.49. Corrosion Protection.

(a) General requirements.

(1) Owners and operators of underground storage tank (UST) systems (or UST system components) which are required to be protected from corrosion shall comply with the requirements in this section to ensure that releases due to corrosion are prevented for as long as the UST system is used to store regulated substances.

(2) All corrosion protection systems shall be designed, installed, operated, and maintained in a manner that will ensure that corrosion protection will be continuously provided to all components of the UST system for as long as the components are used to store regulated substances.

(3) Any alternative methods for corrosion protection or variances from the requirements of this section are prohibited, except when reviewed and approved by the executive director pursuant to procedures for variances found in §334.43 of this title (relating to Variances and Alternative Procedures).

(4) Corrosion protection in accordance with the provisions of this section shall be provided to all underground components of an UST system which are designed or used to convey, contain, or store regulated substances, including, but not necessarily limited to, the tanks, piping (including valves, fittings, flexible connectors, swing joints and impact/shear valves), secondary containment devices, manways, manholes, fill pipes, vent lines, submersible pump housings, spill containers, and riser pipes.

(5) For internal corrosion protection, the interior bottom surface of new metal tanks installed on or after the effective date of this subchapter, shall be fitted with a striker plate under all fill, gauge, and monitoring openings.

(b) Allowable corrosion protection methods. All components of an UST system which are designed to convey, contain, or store regulated substances shall be protected from corrosion by one or more of the following methods.

(1) The component may be constructed of a non-corrodible material which is compatible with the stored regulated substance(s).

(2) The component may be electrically isolated from the corrosive elements of the surrounding soil, backfill, groundwater, and other metallic components by installing the component in an open area (e.g., manway, sump, vault, pit, etc.) where periodic visual inspection of all parts of the component for the presence of corrosion or released substances is practicable.

(3) The component may be electrically isolated from the corrosive elements of the surrounding soil, backfill, groundwater, and other metallic components by completely enclosing the component in a secondary containment device (e.g., wall, jacket, or liner), provided that:

(A) the secondary containment device is designed and installed in accordance with the applicable technical and installation standards in §334.45(d) of this title (relating to Technical Standards for New Underground Storage Tank Systems) and §334.46(f) of this title (relating to Installation Standards for New Underground Storage Tank Systems), and in accordance with an applicable code or standard of practice developed by a nationally recognized association or independent testing laboratory, and is either:

(i) constructed of a non-corrodible material which is compatible with the stored regulated substance;

(ii) electrically isolated from the protected component and other metallic components; or

(iii) cathodically protected by either a factory-installed or field-installed cathodic protection system meeting the applicable requirements of subsection (c) of this section; and

(B) the interstitial space between the protected component and the secondary containment device shall be free of any soil, backfill material, groundwater, or other substances, and the protected component shall be regularly inspected and tested for electrical isolation in accordance with the provisions in subsection (d)(1) of this section.

(4) Tanks (only) may be factory-constructed either as a steel/fiberglass-reinforced plastic composite tank, or as a steel tank with a bonded fiberglass-reinforced plastic external cladding or laminate, in accordance with the requirements in §334.45(b)(1)(D) of this title (relating to Technical Standards for New Underground Storage Tank Systems).

(5) The component may be coated with a suitable dielectric material, equipped with appropriate dielectric fittings for electrical isolation, and equipped with either:

(A) a factory-installed cathodic protection system meeting the requirements of subsection (c)(1) of this section; or

(B) a field-installed cathodic protection system meeting the requirements of subsection (c)(2) of this section.

(6) Except for the tanks and the piping system components, other underground components of a UST system (including vent lines, fill risers, submersible pump risers and housings, spill containment vessels, and tank fittings (e.g., bung hole plugs)) which do not routinely contain regulated substances may be protected from corrosion by thorough coating or wrapping with a suitable dielectric material which is compatible with the stored regulated substance without the need for the use of other corrosion protection methods.

(c) Cathodic protection systems.

(1) Factory-installed cathodic protection systems.

(A) A factory-installed cathodic protection system on any UST component shall be designed, fabricated, installed, operated, and maintained in accordance with applicable codes or standards of practice developed for such cathodic protection method by a nationally recognized association or independent testing laboratory.

(B) At a minimum, the factory-installed cathodic protection system shall include the following components:

(i) a suitable dielectric external coating or laminate, which shall thoroughly cover all exterior surfaces exposed to the soil, backfill, or groundwater, and which shall consist of materials which are compatible with the stored regulated substances;

(ii) dielectric isolation bushings, connections, or fittings, which shall be installed at all locations where the protected component connects to other metallic system components, and which shall be constructed of materials which are compatible with the stored regulated substances; and

(iii) sacrificial anodes which are firmly attached and electrically-connected to the protected components and which are positioned and sized to provide complete cathodic protection for all parts of the protected component.

(2) Field-installed cathodic protection systems.

(A) A field-installed cathodic protection system on any UST system component shall be designed by a qualified corrosion specialist, and shall be designed, installed, operated, and maintained in accordance with applicable codes or standards of practice developed for such cathodic protection systems by a nationally recognized association or independent testing laboratory.

(B) Impressed current cathodic protection systems shall be designed and equipped with appropriate equipment or devices capable of indicating the operational status of the system at all times.

(C) In addition to the standard inspection and testing requirements for all cathodic protection systems required in paragraph (4) of this subsection, all impressed current cathodic protection systems shall be regularly inspected by the owner or operator (or the owner's designated representative) to ensure that the rectifier and other system components are operating properly. Such inspections shall be performed at least once every 60 days.

(3) Test stations and connections. To allow for the periodic testing required in paragraph (4) of this subsection, any factory-installed or field-installed cathodic protection system shall include appropriate connections, insulated lead wires, and accessible test stations. All lead wires connected to the tanks, anodes, reference electrodes, and other components associated with the cathodic protection system shall terminate at one or more test stations. The termination of each lead wire at a test station shall be clearly labeled or coded to properly identify the specific component to which it is connected.

(4) Inspection and testing requirements for all cathodic protection systems.

(A) Except as provided in subsection (d)(2) of this section, all cathodic protection systems which are used to provide corrosion protection for any component of an UST system shall be inspected and tested to determine the adequacy of the cathodic protection by a qualified corrosion specialist or corrosion technician in accordance with the requirements in this paragraph.

(B) The inspection and testing criteria used to determine the adequacy of the cathodic protection shall be in accordance with a code or standard of practice developed by a nationally recognized corrosion association or independent testing laboratory.

(C) All cathodic protection systems shall be inspected and tested for operability and adequacy of protection within three to six months after installation and at a subsequent frequency of at least once every three years.

(d) Requirements for other corrosion protection methods.

(1) Electrically-isolated components.

(A) Any metal component of an UST system which is protected from corrosion by one of the electrical isolation methods described in subsection (b)(2) and (3) of this section, and which is not equipped with a cathodic protection system, shall be periodically inspected and tested to ensure that the metal component remains electrically isolated from the surrounding soil, backfill, groundwater, and other metal components in accordance with one or more of the following procedures.

(i) When visual inspection is possible, the entire exterior surface of such component may be thoroughly inspected visually by qualified personnel for the presence of corrosion or released regulated substances.

(ii) If visual inspection is not possible, the component may be inspected and tested by a qualified corrosion technician or by a qualified corrosion specialist by taking structure to soil voltage readings in accordance with procedures established by a code or standard of practice developed by a nationally-recognized association or independent testing laboratory.

(iii) The component may be inspected and/or tested by an alternative method which has been reviewed and determined by the executive director to ascertain electrical isolation and to prevent the release or threatened release of any stored regulated substance in a manner that is no less protective of human health and safety and the environment than the methods described in clauses (i) and (ii) of this subparagraph, in accordance with the procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(B) The inspections and tests required in subparagraph (A) of this paragraph shall be conducted within three to six months after installation of the metal component, and then once every three years thereafter for the remaining operational life of the UST system.

(C) If the tests required in subparagraph (A) of this paragraph indicate that the metal component is no longer electrically isolated from the surrounding soil, backfill, groundwater, or other metal components, a qualified corrosion specialist shall review the test results and thoroughly inspect the area of the metal component to ascertain the extent of electrical isolation and corrosion protection for the component.

(D) If the qualified corrosion specialist determines that the metal component is no longer adequately protected from corrosion, the owner or operator shall assure that one or more of the following procedures are completed within 60 days of the date of such determination:

(i) appropriate repairs or modifications shall be made to restore the electrical isolation of the protected component; or

(ii) a field-installed cathodic protection system meeting the requirements of subsection (c)(2) of this section shall be installed.

(2) Dual-protected tanks. If a steel/fiberglass-reinforced plastic composite tank, or a steel tank with a bonded fiberglass-reinforced plastic external cladding or laminate, is also equipped with a factory-installed cathodic protection system, then the normal inspection and testing requirements for cathodic protection systems in subsection (c)(4) of this section may be waived. This paragraph shall be applicable only to tanks meeting the design and construction requirements in §334.45(b)(1)(D) of this title (relating to Technical Standards for New Underground Storage Tank Systems), and when such tanks are fitted with factory-installed cathodic protection system meeting the requirements of subsection (c)(1) of this section.

(e) Corrosion protection records.

(1) Owners and operators shall maintain all corrosion protection records required in this subsection in accordance with the requirements in §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) Owners and operators shall maintain records adequate to demonstrate compliance with the corrosion protection requirements in this section, and in accordance with the following minimum requirements.

(A) All appropriate installation records related to the corrosion protection system, as listed in §334.46(i) of this title (relating to Installation Standards for New Underground Storage Tank Systems), shall be maintained for as long as the corrosion protection system is used, including:

(i) the name, address, telephone number, and corrosion-protection credentials of either the company which designed the factory-installed cathodic protection system or the corrosion specialist who designed the field-installed cathodic protection system, as applicable;

(ii) drawings or plans depicting the locations of all cathodic protection system components, including the locations of all test stations; and

(iii) operating instructions and warranty information, maintenance schedules, and testing procedures for all operational components of the cathodic protection systems.

(B) The following corrosion protection records shall be maintained for at least five years after the applicable test or inspection is conducted:

(i) results of all tests and inspections of any impressed current cathodic protection system conducted in accordance with subsection (c)(2)(C) of this section;

(ii) results of all tests and inspections of the adequacy of any cathodic protection system conducted in accordance with subsection (c)(4) of this section;

(iii) results of all tests and inspections to assure corrosion protection for electrically-isolated components in accordance with subsection (d)(1) of this section.

§334.50. Release Detection.

(a) General requirements.

(1) Owners and operators of new and existing underground storage tank (UST) systems shall provide a method, or combination of methods, of release detection which shall be:

(A) capable of detecting a release from any portion of the UST system which contains regulated substances including the tanks, piping, and other ancillary equipment;

(B) installed, calibrated, operated, and maintained in accordance with the manufacturer's specifications and instructions, and by personnel possessing the necessary experience, training, and competence to accomplish such requirements; and

(C) capable of meeting the particular performance requirements of such method (or methods) as specifically prescribed in this section, based on the performance claims by the equipment manufacturer or installer, provided that the following additional requirements shall also be met.

(i) Any performance claims, together with their bases or methods of determination, shall be obtained from the equipment manufacturer or installer and shall be in writing.

(ii) When any of the following release detection methods are used on or after December 22, 1990 (except for methods permanently installed and in operation prior to that date), such method shall be capable of detecting the particular release rate or quantity specified for that method such that the probability of detection shall be at least 95% and the probability of false alarm shall be no greater than 5.0% :

(I) tank tightness testing, as prescribed in subsection (d)(1)(A) of this section;

(II) automatic tank gauging, as prescribed in subsection (d)(4) of this section;

(III) automatic line leak detectors for piping, as prescribed in subsection (b)(2)(A)(i) of this section; and

(IV) piping tightness testing, as prescribed in subsection (b)(2)(A) (ii)(I) of this section.

(2) When a release detection method operated in accordance with the particular performance standards for that method indicates that a release either has or may have occurred, the owners and operators shall comply with the applicable release reporting, investigation, and corrective action requirements in Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(3) Owners and operators of all UST systems shall comply with the release detection requirements of this section in accordance with the applicable schedules in §334.44 of this title (relating to Implementation Schedules).

(4) As prescribed in §334.47(a)(2) of this title (relating to Technical Standards for Existing Underground Storage Tank Systems), any existing UST system that cannot be equipped or monitored with a method of release detection that meets the requirements of this section shall be permanently removed from service in accordance with the applicable procedures in §334.55 of this title (relating to Permanent Removal from Service) no later than 60 days after the implementation date for release detection as prescribed by the applicable schedules in §334.44 of this title (relating to Implementation Schedules).

(5) Any owner or operator who plans to install a release detection method for an UST system shall comply with the applicable construction notification requirements in §334.6 of this title (relating to Construction Notification), and upon completion of the installation of such method shall also comply with the applicable registration and certification requirements of §334.7 of this title (relating to Registration) and §334.8 of this title (relating to Certification).

(6) Any equipment installed or used for conducting release detection for an UST system shall be listed, approved, designed, and operated in accordance with standards developed by a nationally-recognized association or independent testing laboratory (e.g., UL) for such installation or use.

(b) Release detection requirements for all UST systems. Owners and operators of all UST systems shall ensure that release detection equipment or procedures are provided in accordance with the following requirements.

(1) Release detection requirements for tanks.

(A) Except as provided in subparagraphs (B) and (C) of this paragraph, all tanks shall be monitored for releases at a frequency of at least once every month (not to exceed 35 days between each monitoring) by using one or more of the release detection methods described in subsection (d)(4)-(9) of this section.

(B) A combination of tank tightness testing and inventory control in accordance with subsection (d)(1) of this section may be used as an acceptable release detection

method for tanks only until December 22, 1998, and the required frequency of the tank tightness test shall be based on the following criteria.

(i) A tank tightness test shall be conducted at least once each year for any tank in an existing UST system which is not being operated in violation of the upgrading or replacement schedule in §334.44(b) of this title (relating to Implementation Schedules), but has not yet been either:

(I) replaced with a UST system meeting the applicable technical and installation standards in §334.45 of this title (relating to Technical Standards for New Underground Storage Tank Systems) and §334.46 of this title (relating to Installation Standards for New Underground Storage Tank Systems); or

(II) retrofitted or equipped in accordance with the minimum upgrading requirements applicable to existing UST systems in §334.47 of this title (relating to Technical Standards for Existing Underground Storage Tank Systems).

(ii) A tank tightness test shall be conducted at least once every five years for any tank in an UST system which has been either:

(I) installed in accordance with the applicable technical standards for new UST systems in §334.45 of this title (relating to Technical Standards for New Underground Storage Tank Systems) and §334.46 of this title (relating to Installation Standards for New Underground Storage Tank Systems); or

(II) retrofitted or equipped in accordance with the minimum upgrading requirements applicable to existing UST systems in §334.47 of this title (relating to Technical Standards for Existing Underground Storage Tank Systems).

(C) The manual tank gauging method of release detection, as prescribed in subsection (d)(2) of this section, may be used as the sole release detection system only for a petroleum substance tank with a nominal capacity of 550 gallons or less. The monthly tank gauging method of release detection, as prescribed in subsection (d)(3) of this section, may be used as the sole release detection system only for emergency generator tanks.

(D) In addition to the requirements in subparagraphs (A)-(C) of this paragraph, any tank in a hazardous substance UST system shall also be equipped with a secondary containment system and related release detection equipment, as prescribed in subsection (c) of this section.

(2) Release detection for piping. Piping in an underground storage tank system shall be monitored in a manner designed to detect a release from any portion of the piping system, and in accordance with the following requirements.

(A) Requirements for pressurized piping. UST system piping that conveys regulated substances under pressure shall be in compliance with the following requirements.

(i) Each separate pressurized line shall be equipped with an automatic line leak detector meeting the following requirements.

(I) The line leak detector shall be capable of detecting any release from the piping system which equals or exceeds three gallons per hour when the piping pressure is at ten pounds per square inch.

(II) The line leak detector shall be capable of alerting the UST system operator of any release within one hour of occurrence either by shutting off the flow of regulated substances, by substantially restricting the flow of regulated substances, or by emitting or triggering audible and visible alarms.

(III) The line leak detector shall be tested at least once per year for performance and operational reliability and shall be properly calibrated and maintained, in accordance with the manufacturer's specifications and recommended procedures.

(ii) In addition to the required line leak detector prescribed in clause (i) of this subparagraph, each pressurized line shall also be tested or monitored for releases in accordance with at least one of the following methods.

(I) The piping may be tested at least once per year by means of a piping tightness test conducted in accordance with a code or standard of practice developed by a national recognized association or independent testing laboratory. Any such piping tightness test shall be capable of detecting any release from the piping system which equals or exceeds a rate of 0.1 gallons per hour when the piping pressure is at 150% of normal operating pressure.

(II) The piping may be monitored for releases at least once every month (not to exceed 35 days between each monitoring) by using one or more of the release detection methods prescribed in subsection (d)(5)-(9) of this section.

(B) Requirements for suction piping and gravity flow piping.

(i) Except as provided in clause (ii) of this subparagraph, each separate line in an UST piping system that conveys regulated substances either under suction or by gravity flow shall meet at least one of the following requirements.

(I) Each separate line may be tested at least once every three years by means of a piping tightness test conducted in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory. Any such piping test shall be capable of detecting any release from the piping system which equals or exceeds a rate of 0.1 gallon per hour when the piping pressure is at 150% of normal operating pressure.

(II) Each line may be monitored for releases at least once every month (not to exceed 35 days between each monitoring) by using one or more of the release detection methods prescribed in subsection (d)(5)-(9) of this section.

(ii) No release detection methods are required to be installed or applied for any piping system that conveys regulated substances under suction when such suction piping system is designed and constructed in accordance with the following standards:

(I) the below-grade piping operates at less than atmospheric pressure;

(II) the below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if the suction is released;

(III) only one check valve is included in each suction line;

(IV) the check valve is located directly below and as close as practical to the suction pump; and

(V) a method is incorporated into the system design that will allow verification that the requirements under subclauses (I)-(IV) of this clause have been met.

(C) Monitoring secondary containment. In addition to the requirements in subparagraphs (A) and (B) of this paragraph, all piping in a hazardous substance UST system shall also be equipped with a secondary containment system and related release detection equipment, as prescribed in subsection (c) of this section.

(c) Additional release detection requirements for hazardous substance UST systems. In addition to the release detection requirements for all UST systems prescribed in subsections (a) and (b) of this section, owners and operators of all hazardous substance UST systems shall also assure compliance with the following additional requirements:

(1) All new hazardous substance UST systems shall be in compliance with the requirements of paragraph (3) of this subsection for the entire operational life of the system.

(2) All existing hazardous substance UST systems shall be brought into compliance with the requirements of paragraph (3) of this subsection no later than December 22, 1998.

(3) Secondary containment and monitoring.

(A) All hazardous substance UST systems (including tanks and piping) shall be equipped with a secondary containment system which shall be designed, constructed, installed, and maintained in accordance with §334.45(d) of this title (relating to Technical Standards for New

Underground Storage Tank Systems) and §334.46(f) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(B) All hazardous substance UST systems (including tanks and piping) shall include one or more of the release detection methods or equipment prescribed in subsection (d)(7)-(9) of this section, which shall be capable of monitoring the space between the primary tank and piping walls and the secondary containment wall or barrier.

(d) Allowable methods of release detection. Tanks in an UST system may be monitored for releases using one or more of the methods included in paragraphs (1)-(9) of this subsection. Piping in a UST system may be monitored for releases using one or more of the methods included in paragraphs (5)-(9) of this subsection. Any method of release detection for tanks and/or piping in this section shall be allowable only when installed (or applied), operated, calibrated, and maintained in accordance with the particular requirements specified for such method in this subsection.

(1) Tank tightness testing and inventory control. A combination of tank tightness testing and inventory control may be used as a tank release detection method only until December 22, 1998, subject to the following conditions and requirements.

(A) Tank tightness test. Any tank tightness test shall be conducted in conformance with the following standards.

(i) The tank tightness test shall be conducted in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(ii) The tank tightness test shall be performed by qualified personnel who possess the requisite experience, training, and competence to conduct the test properly, who are present at the facility and who maintain responsible oversight throughout the entire testing procedure, and who have been certified by the manufacturer or developer of the testing equipment as being qualified to perform the test. The tank tightness test shall be conducted in strict accordance with the testing procedures developed by the system manufacturer or developer.

(iii) The tank tightness test shall be capable of detecting a release which equals or exceeds a rate of 0.1 gallon per hour from any portion of the tank which contains regulated substances.

(iv) The tank tightness test shall be performed in a manner that will account for the effects of vapor pockets, thermal expansion or contraction of the stored substance, temperature of the stored substance, temperature stratification, evaporation or condensation, groundwater elevation, pressure variations within the system, tank end deflection, tank deformation, and any other factors that could affect the accuracy of the test procedures.

(B) Inventory control. All inventory control procedures shall be in conformance with the following requirements.

(i) All inventory control procedures shall be in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(ii) Reconciliation of detailed inventory control records shall be conducted at least once each month, and shall be sufficiently accurate to detect a release which equals or exceeds the sum of 1.0% of the total substance flow-through for the month plus 130 gallons.

(iii) The operator shall assure that the following additional procedures and requirements are followed.

(I) Inventory volume measurement for regulated substance inputs, withdrawals, and the amount still remaining in the tank shall be recorded each operating day.

(II) The equipment used shall be capable of measuring the level of stored substance over the full range of the tank's height to the nearest one-eighth of an inch.

(III) Substance dispensing shall be metered and recorded within the local standards for meter calibration or within an accuracy of six cubic inches for every five gallons of product withdrawn.

(IV) The measurement of any water level in the bottom of the tank shall be made to the nearest one-eighth of an inch at least once a month, and appropriate adjustments to the inventory records shall be made.

(iv) For tanks with a nominal capacity of 2,000 gallons or less, the owner or operator may use the manual tank gauging method (in accordance with paragraph (2) of this subsection) as a substitute for the inventory control procedures prescribed in this subsection.

(2) Manual tank gauging. Manual tank gauging may be used as a tank release detection method, subject to the following limitations and requirements.

(A) Manual tank gauging in accordance with this subparagraph may be used as the sole method of tank release detection only for petroleum substance tanks having a nominal capacity of 550 gallons or less.

(B) When used in conjunction with tank tightness testing performed in accordance with paragraph (1)(A) of this subsection, manual tank gauging may be used in lieu of the normal inventory control procedures in paragraph (1)(B) of this subsection as a tank release detection method for any tanks having a nominal capacity of 2000 gallons or less.

(C) The use of manual tank gauging shall not be considered an acceptable method for meeting the release detection requirements of this section for any tanks with a nominal capacity greater than 2,000 gallons.

(D) When used for compliance with the release detection requirements of this section, the procedures and requirements in the following clauses shall be applicable.

(i) For purposes of this subparagraph only, the following definitions are applicable:

(I) Level measurement -- The average of two consecutive liquid level readings from a tank gauge, measuring stick, or other measuring equipment.

(II) Gauging period -- A weekly period of at least 36 hours during which no substance is added to or removed from the tank.

(III) Weekly deviation -- The variation between the level measurements taken at the beginning and the end of one gauging period, converted to and expressed as gallons.

(IV) Monthly deviation -- The arithmetic average of four consecutive weekly deviations, expressed as gallons.

(ii) Any measuring equipment shall be capable of measuring the level of stored substance over the full range of the tank's height to the nearest one-eighth of an inch.

(iii) Separate liquid level measurements in the tank shall be taken weekly at the beginning and the ending of the gauging period, and the weekly deviation shall be determined from such level measurements.

(iv) Once each month, after four consecutive weekly deviations are determined, a monthly deviation shall be calculated.

(v) For the purposes of the manual tank gauging method of release detection, a release shall be indicated when either the weekly deviation or the monthly deviation exceeds the maximum allowable standards indicated in the following subclauses:

(I) for a tank with a capacity of 550 gallons or less: weekly standard = 10 gallons; monthly standard = five gallons;

(II) for a tank with a capacity of 551 gallons to 1,000 gallons: weekly standard = 13 gallons; monthly standard = seven gallons;

(III) for a tank with a capacity of 1,001 gallons to 2,000 gallons: weekly standard = 26 gallons; monthly standard = 13 gallons.

(vi) When either the weekly standard or the monthly standard is exceeded and a suspected release is thereby indicated, the owner or operator shall comply with the applicable release reporting, investigation, and corrective action requirements of Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(3) Monthly tank gauging. Monthly tank gauging may be used as a tank release detection method, subject to the following limitations and requirements.

(A) Monthly tank gauging in accordance with this paragraph may be used as the sole method of tank release detection only for emergency generator tanks.

(B) The use of monthly tank gauging shall not be considered an acceptable method for meeting the release detection requirements of this section for any tanks other than emergency generator tanks.

(C) When used for compliance with the release detection requirements of this section, the procedures and requirements in the following clauses shall be applicable.

(i) For purposes of this paragraph only, the following definitions are applicable.

(I) Level measurement - The average of two consecutive liquid level readings from a tank gauge, measuring stick, or other manual or automatic measuring equipment.

(II) Gauging period - A period of at least 36 hours during which no substance is added to or removed from the tank.

(III) Monthly deviation - The variation between the level measurements taken at the beginning and the end of one gauging period, converted to and expressed as gallons.

(ii) Any measuring equipment (whether operated manually or automatically) shall be capable of measuring the level of a stored substance over the full range of the tank's height to the nearest one-eighth of an inch.

(iii) Separate liquid level measurements in the tank shall be taken at least once monthly at the beginning and the ending of the gauging period, and the monthly deviation shall be determined from such level measurements.

(iv) For the purposes of the monthly tank gauging method of release detection, a release shall be indicated when the monthly deviation exceeds the maximum allowable standards indicated in the following subclauses:

(I) for a tank with a capacity of 550 gallons or less; monthly standard = five gallons;

(II) for a tank with a capacity of 551 gallons to 1,000 gallons: monthly standard = seven gallons;

(III) for a tank with a capacity of 1,001 gallons to 2,000 gallons: monthly standard = 13 gallons;

(IV) for a tank with a capacity greater than 2,000 gallons: monthly standard = 1.0% of the total tank capacity.

(v) When the monthly standard is exceeded and a suspected release is thereby indicated, the owner or operator shall comply with the applicable release reporting, investigation, and corrective action requirements of Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(4) Automatic tank gauging and inventory control.

(A) A combination of automatic tank gauging and inventory control may be used as a tank release detection method, subject to the following requirements.

(i) Inventory control procedures shall be in compliance with paragraph (1)(B) of this subsection.

(ii) The automatic tank gauging equipment shall be capable of:

(I) automatically monitoring the in-tank liquid levels, conducting automatic tests for substance loss, and collecting data for inventory control purposes; and

(II) performing an automatic test for substance loss that can detect a release which equals or exceeds a rate of 0.2 gallon per hour from any portion of the tank which contains regulated substances.

(B) For emergency generator tanks only, automatic tank gauging may be used as a tank release detection method, provided that the automatic tank gauging equipment shall be capable of:

(i) automatically monitoring the in-tank liquid levels;

(ii) conducting continuous automatic tests for substance loss during the periods when the emergency generator engine is not in operation; and

(iii) performing an automatic test for substance loss that can detect a release which equals or exceeds a rate of 0.2 gallon per hour from any portion of the tank which contains regulated substances.

(5) Vapor monitoring. Equipment and procedures designed to test or monitor for the presence of vapors from the regulated substance (or from a related tracer substance) in the soil gas of the backfilled excavation zone may be used, subject to the following limitations and requirements.

(A) The bedding and backfill materials in the excavation zone shall be sufficiently porous to allow vapors from any released regulated substance (or related tracer substance) to rapidly diffuse through the excavation zone (e.g., gravel, sand, crushed rock).

(B) The stored regulated substance, or any tracer substance placed in the tank system, shall be sufficiently volatile so that, in the event of a substance release from the UST system, vapors will develop to a level that can be readily detected by the monitoring devices located in the excavation zone.

(C) The capability of the monitoring device to detect vapors from the stored regulated substance shall not be adversely affected by the presence of any groundwater, rainfall, and/or soil moisture in a manner that would allow a release to remain undetected for more than one month (not to exceed 35 days).

(D) Any preexisting background contamination in the excavation zone shall not interfere with the capability of the vapor monitoring equipment to detect releases from the UST system.

(E) The vapor monitoring equipment shall be designed to detect vapors from either the stored regulated substance, a component or components of the stored substance, or a tracer substance placed in the UST system, and shall be capable of detecting any significant increase in vapor concentration above preexisting background levels.

(F) Prior to installation of any vapor monitoring equipment, the site of the UST system (within the excavation zone) shall be assessed by qualified personnel to:

(i) ensure that the requirements in subparagraphs (A)-(D) of this paragraph have been met; and

(ii) determine the appropriate number and positioning of any monitor wells and/or observation wells, so that releases into the excavation zone from any part of the UST system can be detected within one month of the release (not to exceed 35 days).

(G) All monitoring wells and observation wells shall be designed and installed in accordance with the requirements of §334.46(g) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(6) Groundwater monitoring. Equipment or procedures designed to test or monitor for the presence of regulated substances floating on or dissolved in the groundwater in the excavation zone may be used, subject to the following limitations and requirements.

(A) The stored regulated substance shall be immiscible in water and shall have a specific gravity of less than one.

(B) The natural groundwater level shall never be more than 20 feet (vertically) from the ground surface, and the hydraulic conductivity of the soils or backfill between all parts of the UST system and the monitoring points shall not be less than 0.01 centimeters per second (i.e., the soils or backfill shall consist of gravels, coarse to medium sands, or other similarly permeable material).

(C) Any automatic monitoring devices that are employed shall be capable of detecting the presence of at least one-eighth inch of free product on top of the groundwater in the monitoring well or observation well. Any manual monitoring method shall be capable of detecting a visible sheen or other accumulation of regulated substances in or on the groundwater in the monitoring well or observation well.

(D) Prior to installation of any groundwater monitoring equipment, the site of the UST system (within and immediately below the excavation zone) shall be assessed by qualified personnel to:

(i) ensure compliance with the requirements of subparagraphs (A) and (B) of this paragraph; and

(ii) determine the appropriate number and positioning of any monitoring wells and/or observation wells, so that releases from any part of the UST system can be detected within one month (not to exceed 35 days) of the release.

(E) All monitoring wells and observation wells shall be designed, installed, and maintained in accordance with the requirements in §334.46(g) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(7) Interstitial monitoring for double-wall UST systems. Equipment designed to test or monitor for the presence of regulated substance vapors or liquids in the interstitial space between the inner (primary) and outer (secondary) walls of a double-wall underground storage tank system may be used, subject to the following conditions and requirements.

(A) Any double-wall UST system using this method of release detection shall be designed, constructed, and installed in accordance with the applicable technical and installation requirements in §334.45(d) of this title (relating to Technical Standards for New Underground Storage Tank Systems) and §334.46(f) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(B) The sampling, testing, or monitoring method shall be capable of detecting any release of stored regulated substances from any portion of the primary tank or piping within one month (not to exceed 35 days) of the release.

(C) The sampling, testing, or monitoring method shall be capable of detecting a breach or failure in the primary wall and the entrance of groundwater into the interstitial space due to a breach in the secondary wall of the double-wall tank or piping system within one month (not to exceed 35 days) of such breach or failure (whether or not a stored regulated substance has been released into the environment).

(8) Monitoring of UST systems with secondary containment barriers. Equipment designed to test or monitor for the presence of regulated substances (liquids or vapors) in the excavation zone between the UST system and an impermeable secondary containment barrier immediately around the UST system may be used, subject to the following conditions and requirements.

(A) Any secondary containment barrier or liner system at a UST system using this method of release detection shall be designed, constructed, and installed in accordance with the applicable technical and installation requirements in §334.45(d) of this title (relating to Technical Standards for New Underground Storage Tank Systems) and §334.46(f) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(B) The sampling, testing, or monitoring method shall be capable of detecting any release of stored regulated substance from any portion of the UST system into the excavation zone between the UST system and the secondary containment barrier within one month (not to exceed 35 days) of the release.

(C) The sampling, testing, or monitoring method shall be designed and installed in a manner that will ensure that groundwater, soil moisture, and rainfall will not render the method inoperative where a release could remain undetected for more than one month (not to exceed 35 days).

(D) Prior to installation of any secondary containment release monitoring equipment, the site of the UST system shall be assessed by qualified personnel to:

(i) ensure that the secondary containment barrier will be positioned above the groundwater level and outside the designated 25-year flood plain, unless the barrier and the monitoring equipment are designed for use under such conditions; and

(ii) determine the appropriate number and positioning of any observation wells.

(E) All observation wells shall be designed and installed in accordance with the requirements in §334.46(g) of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(9) Alternative release detection method. Any other release detection method, or combination of methods, may be used if such method has been reviewed and determined by the executive director to be capable of detecting a release from any portion of the UST system in a manner that is no less protective of human health and safety and the environment than the methods described in paragraphs (1)-(8) of this subsection, in accordance with the provisions of §334.43 of this title (relating to Variances and Alternative Procedures).

(e) Release detection records.

(1) Owners and operators shall maintain the release detection records required in this subsection in accordance with the requirements in §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) Owners and operators shall maintain records adequate to demonstrate compliance with the release detection requirements in this section, and in accordance with the following minimum requirements.

(A) All appropriate installation records related to the release detection system, as listed in §334.46(i) of this title (relating to Installation Standards for New Underground Storage Tank Systems), shall be maintained for as long as the release detection system is used.

(B) All written performance claims pertaining to any release detection system used, and documentation of the manner in which such claims have been justified or tested by the equipment manufacturer or installer, shall be maintained for as long as the release detection system is used.

(C) Records of the results of all manual and/or automatic methods of sampling, testing, or monitoring for releases (including tank tightness tests) shall be maintained for at least five years after the sampling, testing, or monitoring is conducted.

(D) Records and calculations related to inventory control reconciliation shall be maintained for at least five years from the date of reconciliation.

(E) Written documentation of all service, calibration, maintenance, and repair of release detection equipment permanently located on-site shall be maintained for at least five years after the work is completed. Any schedules of required calibration and maintenance provided by the

release detection equipment manufacturer shall be retained for as long as the release detection system is used.

§334.51. Spill and Overfill Prevention and Control.

(a) General spill and overfill control requirements.

(1) Owners and operators of all new and existing underground storage tank (UST) systems shall ensure that releases of regulated substances due to spills and overfills do not occur.

(2) Prior to regulated substances being transferred and deposited into an UST system, the owner or operator shall ensure that the available volume in the tank is greater than the volume of regulated substances to be transferred into the tank.

(3) During the entire time that regulated substances are being transferred into an UST system, the owner or operator shall ensure that the entire transfer operation is continuously monitored by the person conducting the transfer. Except as provided in paragraph (4) of this subsection, such monitoring may be accomplished by either of the following methods.

(A) The person conducting the transfer shall be physically present at or near the transfer point at all times during the transfer operation, and shall have an unobstructed view of the transfer point to observe the transfer and to abate any spill or overfill.

(B) The person conducting the transfer shall be physically present at the facility at all times during the transfer operation, and shall monitor the transfer operation using a central monitoring station which is electronically connected to remote sensing equipment at each transfer point, where such equipment is designed to detect and prevent any spills or overfills.

(4) When USTs are equipped with ball float valves in the vent openings (or with other similar flow restrictors) for the purposes of compliance with the overfill prevention equipment requirements of subsection (b)(2)(C) of this section, and when regulated substances are transferred into such tanks under pressure (other than routine gravity unloading from normal transport vehicles), the following requirements shall be met during the time that regulated substances are being transferred into the tank.

(A) The person conducting the transfer shall be physically present at or near the transfer point at all times during the transfer operation, and shall have an unobstructed view of the transfer point to observe the transfer and to abate any spill or overfill.

(B) The transfer hose connection shall be equipped with an appropriate back-pressure sensor that will automatically shut-off flow into the tank when the pressure in the tank reaches the tank's allowable design pressure (typically five psig).

(5) The owners or operators shall assure that the installation and maintenance of all required spill and overfill prevention equipment, as well as the procedures used for the transfers of regulated substances to or from a UST system, are in accordance with codes or standards of practice developed by a nationally recognized association or independent testing laboratory.

(6) The owner or operator shall assure that all spill and overfill prevention devices installed pursuant to subsection (b) of this section are maintained in good operating condition, and that such devices are inspected and serviced in accordance with the manufacturers' specifications.

(7) In the event a release of regulated substance(s) occurs due to a spill or overfill, the owner or operator shall comply with the release reporting, investigation, and corrective action requirements in Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(b) Spill and overfill prevention equipment. Except as provided in paragraph (4) of this subsection, all UST systems shall be equipped with spill and overfill prevention equipment which shall be designed, installed, and maintained in a manner that will prevent any spilling or overfilling of regulated substances resulting from transfers to such systems, as provided in this subsection.

(1) Compliance schedule.

(A) New UST systems installed on or after the effective date of this subchapter shall be in compliance with the equipment provisions of this subsection from the time of installation through the entire operational life of the system.

(B) Existing UST systems (i.e., UST systems for which installation has commenced or has been completed on or prior to December 22, 1988) shall be in compliance with the equipment provisions of this subsection beginning no later than December 22, 1994, and continuing for the remainder of the operational life of the system.

(2) Equipment required. UST systems shall be equipped with each of the following spill and overfill prevention equipment or devices.

(A) Tight-fill fitting. The fill pipe of the tank shall be equipped with a tight-fill fitting, adapter, or similar device which shall provide a liquid-tight seal during the transfer of regulated substances into the tank.

(B) Spill containment equipment. The fill tube of the tank either shall be equipped with an attached spill container or catchment basin, or shall be enclosed in a liquid-tight manway, riser, or sump, and such equipment shall meet the following requirements.

(i) The spill containment device shall be designed to prevent the release of regulated substances to the environment when the transfer hose or line is detached from the fill pipe.

(ii) The spill containment device shall be equipped with a liquid-tight lid or cover designed to minimize the entrance of any surface water, groundwater, or other foreign substances into the container.

(C) Overfill prevention equipment. Each tank shall be equipped with a valve or other appropriate device that shall be designed to either:

(i) automatically shut off the flow of regulated substances into the tank when the liquid level in the tank reaches a preset level which shall be no higher than the 95% capacity level for the tank; or

(ii) automatically restrict the flow of regulated substances into the tank when the liquid level in the tank reaches a preset level which shall be no higher than the 90% capacity level for the tank, provided that such flow restricting device shall also alert the person responsible for the delivery when such preset level is reached; or

(iii) emit an audible and visible alarm capable of alerting the person responsible for the delivery when the liquid level in the tank reaches a preset level which shall be no higher than the 90% capacity level for the tank, provided that the tank is also equipped with a valve or other device which is designed to automatically shut-off or automatically restrict the flow of regulated substances into the tank when the liquid level reaches a preset level which shall be no higher than the 98% capacity level for the tank.

(3) Design and installation requirements.

(A) All spill and overfill prevention equipment shall be installed in accordance with the manufacturer's instructions and a code or standard of practice developed by a nationally-recognized association or independent testing laboratory.

(B) All underground components of the spill and overfill prevention equipment which are designed to contain regulated substances shall be properly protected from corrosion in accordance with the applicable provisions in §334.49 of this title (relating to Corrosion Protection).

(C) The surfaces of all spill and overfill prevention equipment which are in direct contact with regulated substances shall be constructed of or lined with materials that are compatible with such regulated substances.

(D) When installing the overfill prevention equipment specified in paragraph (2)(C) of this subsection, appropriate extension devices shall be utilized as necessary to assure that the shut-off or restriction of flow into the tank is achieved at the specified preset levels, which shall be based on the manufacturer's capacity charts for the size, dimensions, and shape of the tank.

(4) Exceptions.

(A) UST systems are not required to be equipped with the spill and overfill prevention equipment prescribed in this subsection if one or more of the following conditions are applicable to such system:

(i) the transfers of regulated substances into the UST system do not exceed 25 gallons per occurrence;

(ii) the UST system is equipped with alternative equipment which has been reviewed and determined by the executive director to prevent spills and overfills of regulated substances in a manner that is no less protective of human health and the environment than the equipment prescribed in this subsection, pursuant to procedures for variances found in §334.43 of this title (relating to Variances and Alternative Procedures); or

(iii) the installation of the spill and overfill prevention equipment prescribed in this subchapter has been reviewed and determined by the executive director to be impracticable or unreasonable due to the type, design, or use of the UST system, pursuant to procedures for variances found in §334.43 of this title (relating to Variances and Alternative Procedures).

(B) For existing UST systems which are properly equipped on or before December 22, 1994, with both a tight-fill fitting as prescribed in paragraph (2)(A) of this subsection, and an automatic overfill shut-off device as prescribed in paragraph (2)(C)(i) of this subsection, the implementation date for the installation of spill containment equipment, as prescribed in paragraph (2)(B) of this subsection, shall be deferred until December 22, 1998.

(c) Spill and overfill control records.

(1) Owners and operators shall maintain the spill and overfill control records required in this subsection in accordance with the requirements in §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) Owners and operators shall maintain records adequate to demonstrate compliance with the spill and overfill prevention and control requirements in this section, and in accordance with the following minimum requirements.

(A) All appropriate installation records related to the installation of any spill and overfill prevention equipment, as listed in §334.46(i) of this title (relating to Installation Standards for New Underground Storage Tank Systems), shall be maintained for as long as the spill and overfill prevention equipment is used.

(B) Records of any servicing, calibration, maintenance, and repair of any spill and overfill prevention equipment shall be maintained for at least five years after such work is completed.

(3) If an owner or operator claims an exemption from the spill and overfill equipment requirements under the provisions of subsection (b)(4)(A) of this section (i.e., transfers of 25 gallons or less), such owner or operator shall maintain appropriate transfer or inventory records for at least five years to document the basis for such exemption.

§334.52. Underground Storage Tank System Repairs and Relining.

(a) General requirements.

(1) Owners and operators shall ensure that any repair or relining of a UST system will prevent releases due to structural failure or corrosion for the remaining operational life of the system.

(2) Owners and operators shall ensure that any repair or relining is conducted by qualified personnel possessing the appropriate skills, experience, competence, and, if applicable, any required license or certification to complete the work in accordance with the provisions of this subsection.

(3) Any repairs or relining shall be properly conducted in accordance with a standard or code of practice developed by a nationally recognized association or independent testing laboratory.

(4) After completion of any repairs or relining of a UST system, the owner or operator shall obtain detailed written records of the repairs or relining from the person who performed the work.

(5) The requirements of this section shall not be applicable to routine and minor maintenance activities related to the tank and piping systems, such as tightening loose fittings and joints, adjusting and calibrating equipment, and conducting routine inspections and tests. Tank and piping systems may be placed back into operation immediately after the satisfactory completion of such minor maintenance activities.

(6) If any release of regulated substances is discovered or suspected during the UST system repair or relining activity, the owner or operator shall comply with the applicable release reporting, investigation, and corrective action requirements in Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(7) The performance of any repairs or relining of an existing UST shall not relieve the owner or operator from timely compliance with the technical standards for such tanks, as required in §334.47 of this title (relating to Technical Standards for Existing Underground Storage Tank Systems).

(b) Tank repairs and relining.

(1) The provisions of this subsection shall be applicable to the in-place repairs or relining of existing tanks. Tanks that are removed from the ground prior to repair or relining shall be considered used tanks and shall be brought into compliance with all provisions of §334.53 of this title (relating to Reuse of Used Tanks) prior to being placed back in operation.

(2) A previously-used tank may be repaired or relined and placed back in operation, provided that the repair or relining is conducted in accordance with the provisions of this subsection and in a manner that will prevent releases of regulated substances due to structural failure or corrosion for the remaining operational life of the tank.

(3) Repairs or relining of fiberglass-reinforced plastic tanks shall be made only by either:

(A) an authorized representative of the tank manufacturer; or

(B) any other person possessing the requisite experience and qualifications to perform the repairs, provided that such repairs shall be performed in accordance with a standard or code of practice developed by a nationally recognized association or independent testing laboratory.

(4) Additional requirements for relining.

(A) Interior lining material(s) used in the repair or reconditioning of a UST shall be compatible with the stored regulated substance, and shall be applied to a minimum thickness of 100 mils.

(B) The entire lining process, including the tank preparation, lining application, inspection, and testing shall be in accordance with a standard or code of practice developed by a nationally recognized association or independent testing laboratory.

(5) Prior to placing the tank back into operation, any repaired or relined tank shall be either:

(A) tested by means of a tank tightness test meeting the requirements in §334.50(d)(1)(A) of this title (relating to Release Detection); or

(B) internally inspected and assessed in accordance with the requirements in §334.47(b)(1)(A)(iv) of this title (relating to Technical Standards for Existing Underground Storage Tank Systems); or

(C) tested or assessed by any other method that has been reviewed and determined by the executive director to be no less protective of human health and safety and the environment than the standards described in subparagraphs (A) and (B) of this paragraph, in accordance with the procedures in §334.43 of this title (relating to Variances and Alternative Procedures).

(6) Not later than December 22, 1998, the entire UST system shall be equipped with a cathodic protection system. Such system shall be designed by a qualified corrosion specialist and shall be operated and maintained in accordance with the applicable cathodic protection requirements of §334.49(c) of this title (relating to Corrosion Protection).

(c) Piping repairs and maintenance.

(1) When a release of a regulated substance has occurred as a result of holes, damage, or corrosion in the piping, valves, or fittings, the repair of the affected piping, valves, or fittings shall not be allowed. Any damaged, corroded, or defective piping sections, valves, or fittings shall be replaced with materials or components meeting the applicable requirements for new piping systems in §334.45(c) of this title (relating to Technical Standards for New Underground Storage Tank Systems).

(2) The installation or reinstallation of previously-used piping, valves, or fittings in any underground storage tank system is specifically prohibited, regardless of the source or previous use of such previously-used components.

(3) Prior to placing the piping system back into operation, any repaired piping system shall be tested by means of a piping tightness test meeting the requirements of §334.50(b)(2)(A)(ii)(I) of this title (relating to Release Detection).

(4) If a repaired metal piping system has not already been equipped with an acceptable cathodic protection system, then the following minimum requirements shall be met prior to placing the piping system back in operation.

(A) The repaired piping sections and fittings shall be thoroughly coated with a suitable dielectric coating and shall be electrically isolated from the remaining piping system by dielectric fittings.

(B) The repaired piping sections and fittings shall be retrofitted with a field-installed cathodic protection system. Such cathodic protection system shall be designed by a qualified corrosion specialist and shall be operated and maintained in accordance with the applicable cathodic protection requirements in §334.49(c) of this title (relating to Corrosion Protection). The remaining portion of the piping system shall be brought into compliance with the minimum upgrading requirements for existing UST systems in accordance with the procedures and schedules in §334.47 of this title (relating to Technical Standards for Existing Underground Storage Tank Systems).

(d) Records for repairs and relining.

(1) Owners and operators shall maintain the repair and relining records required in this subsection in accordance with the requirements in §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) Owners and operators shall maintain records adequate to demonstrate compliance with the applicable repairs and relining requirements in this section, and in accordance with the following minimum requirements.

(A) General information related to the repairs or relining shall be maintained for the remaining operational life of the UST system, including:

- (i) date and description of the repairs or relining;
- (ii) names, addresses, and telephone numbers of the persons who conducted the repairs or relining; and
- (iii) copies of all related construction notification, registration, and certification documents filed with the commission.

(B) Results of all inspections, tests, and maintenance activities required in this section shall be maintained for at least five years.

(C) Materials specifications, warranty information, recommended test procedures, and inspection and maintenance schedules applicable to the relining of any tank shall be maintained for the remaining operational life of the UST system.

§334.53. Reuse of Used Tanks.

(a) General requirements.

(1) A used tank may be installed or reinstalled and may be returned to service in accordance with the provisions of this section, provided that the tank is designed and constructed in a manner that will prevent releases of regulated substances due to structural failure or corrosion for the remaining operational life of the tank.

(2) Any required repairs or relining of a used tank shall be in accordance with the provisions of §334.52 of this title (relating to Underground Storage Tank System Repairs and Relining).

(3) The tank material, and any interior or exterior lining material, shall be compatible with the stored regulated substance.

(4) The installation or reinstallation of a used tank shall be in accordance with all requirements applicable to a tank installation in a new underground storage tank (UST) system, as provided in the following subparagraphs.

(A) The installation shall be conducted in accordance with the applicable provisions of §334.46 of this title (relating to Installation Standards for New Underground Storage Tank Systems).

(B) The tank shall be equipped with appropriate spill and overfill prevention equipment, in accordance with §334.51 of this title (relating to Spill and Overfill Prevention and Control).

(C) A used steel tank (including steel tanks with an exterior fiberglass-reinforced plastic cladding or laminate) shall be equipped with a factory-installed or field-installed cathodic protection system in accordance with §334.49(c) of this title (relating to Corrosion Protection).

(D) The tank shall be equipped with appropriate release detection equipment in accordance with §334.50 of this title (relating to Release Detection).

(E) The tank shall also be equipped with other tank components which shall be constructed in accordance with §334.45(b)(4) of this title (relating to Technical Standards for New Underground Storage Tank Systems).

(b) Exterior fiberglass-reinforced plastic coatings. The retrofitting of a used steel tank with an exterior coating, cladding, or laminate consisting of fiberglass-reinforced plastic shall be conducted in accordance with a code of practice or standard developed by a nationally recognized association or independent testing laboratory and, at a minimum, shall meet the following additional conditions.

(1) The steel tank shall be sandblasted or otherwise cleaned to bare white metal, and all residual corrosion, oxidation, and coating materials shall be thoroughly removed.

(2) The cleaned tank shall be protected from further corrosion or other damage during the period between the tank cleaning and the application of the exterior coating.

(3) The bonding materials used to bond the fiberglass materials to the tank wall shall be compatible with the stored substance and shall be designed to remain bonded for the operational life of the tank. The fiberglass-reinforced plastic coating shall be applied to a minimum thickness of 100 mils, and shall be thoroughly tested by appropriate means to confirm compliance with such thickness requirements.

(4) The tank shall be retrofitted with a cathodic protection system in accordance with the provisions of §334.49(c) of this title (relating to Corrosion Protection).

(c) Recordkeeping. Detailed records of the used tank installation shall be maintained in accordance with §334.10 of this title (relating to Reporting and Recordkeeping). Such records shall include the date the used tank was placed in service; the name, address, and telephone number of the persons who installed and tested the tank; and the results of all inspection and tank tightness tests required by this section. Such records shall be maintained for as long as the tank remains in operation.

§334.54. Temporary Removal from Service.

(a) Applicability. An underground storage tank (UST) system shall be considered to be temporarily out of service, regardless of whether or not regulated substances remain in the UST system, when the following conditions apply.

(1) The normal operation and use of the UST system is deliberately, but temporarily, discontinued for any reason.

(2) The infrequent use of the UST system cannot be adequately justified as part of its purpose.

(3) The operation, maintenance, and/or release detection procedures are determined to be inadequate or otherwise inconsistent with the monitoring procedures normally associated with in-service systems of similar type and purpose.

(b) All UST systems. Beginning no later than the date on which any UST system has been out of service for a continuous period of three months, regardless of whether or not regulated substances remain in the UST system, the owner or operator shall assure that the UST system is maintained in compliance with the following requirements for the balance of time that the UST system remains temporarily out of service.

(1) All vent lines shall be kept open and functioning.

(2) All other piping, pumps, manways, and ancillary equipment shall be capped, plugged, locked, and/or otherwise secured to prevent access, tampering, or vandalism by unauthorized persons.

(c) Protected and monitored systems. Any UST system may remain out of service indefinitely so long as the following requirements are met during the period that the UST system remains temporarily out of service.

(1) The UST system shall be adequately protected from corrosion in accordance with the applicable requirements of §334.49 of this title (relating to Corrosion Protection).

(2) Unless the UST system has been emptied of all regulated substances (as described under subsection (e) of this section) at the time it is temporarily removed from service, the UST system shall be monitored for releases in accordance with the applicable requirements of §334.50 of this title (relating to Release Detection).

(3) The UST system shall be operated and maintained in accordance with the requirements of subsection (b) of this section.

(d) Unprotected and unmonitored systems.

(1) Time limitation. If due to the phase-in of upgrades and improvements as allowed under §334.47 of this title (relating to Technical Standards for Existing Underground Storage Tank Systems), any existing UST system is not yet adequately protected from corrosion (as provided under subsection (c)(1) of this section) and any existing non-empty UST system is not yet adequately

monitored for releases (as provided under subsection (c)(2) of this section), such UST systems cannot remain out of service indefinitely and must meet the following requirements.

(A) The UST system shall be operated and maintained in accordance with the provisions of subsection (b) of this section during the time the system is temporarily out of service, which shall not exceed 12 months.

(B) Beginning no later than the date on which the UST system has been out of service for a continuous period of 10 months, regardless of whether or not regulated substances remain in the system, the owner or operator shall initiate appropriate activities or procedures to assure that no later than the date on which the system has been out of service for a continuous period of 12 months, the UST system is either:

(i) permanently removed from service (by disposal in place or removal from the ground), in accordance with the applicable provisions of §334.55 of this title (relating to Permanent Removal from Service);

(ii) brought back into service in conformance with the requirements in paragraph (3) of this subsection; or

(iii) appropriately upgraded such that the UST system is adequately protected from corrosion and adequately monitored for releases of regulated substances in a manner that will allow the system to remain temporarily out of service under the provisions of subsection (c) of this section.

(2) Extension of time. For UST systems which are temporarily out of service, and for which the owner or operator determines that conformance with the schedule under paragraph (1)(B) of this subsection would be impractical or unreasonable, the owner or operator must secure prior approval from the executive director for an extension of time subject to the following conditions.

(A) Any request for extension of time shall be in conformance with §334.43 of this title (relating to Variances and Alternative Procedures).

(B) Any request for extension of time shall be accompanied by written documentation adequate to justify the requested extension and the results of a site assessment conducted in accordance with of §334.55(e) of this title (relating to Permanent Removal from Service).

(3) Returning UST system to service. When an unprotected and unmonitored UST system that has been temporarily out of service for longer than six months is placed back into service, the owner or operator shall:

(A) ensure the integrity of the system by the performance of a tank tightness test and piping tightness test that meet the requirements of §334.50(d)(1)(A) and (b)(2)(A)(ii)(I),

respectively, of this title (relating to Release Detection) prior to bringing the system back into operation; and

(B) ensure that the UST system is brought into compliance with all applicable corrosion protection, release detection, and spill and overfill prevention requirements of §334.49 of this title (relating to Corrosion Protection), §334.50 of this title (relating to Release Detection), and §334.51 of this title (relating to Spill and Overfill Prevention and Control) in accordance with the applicable schedules in §334.44 of this title (relating to Implementation Schedules).

(e) Empty system. For the purposes of this section only, and specifically for the purpose of exempting certain UST systems (when temporarily out of service) from the release detection requirements of this chapter, a UST system shall be considered “empty” when the following provisions have been met.

(1) All regulated substances have been removed as completely as possible by the use of commonly-employed and accepted industry procedures.

(2) Any residue from stored regulated substances which remains in the system (after the completion of the substance removal procedures under paragraph (1) of this subsection) shall not exceed a depth of 2.5 centimeters at the deepest point and shall not exceed 0.3% by weight of the system at full capacity.

(3) The volume or concentration of regulated substances remaining in the system would not pose an unreasonable risk to human health and safety or to the environment if a release occurs during the period when the system is temporarily out of service.

(f) Other requirements.

(1) Releases. If a release of a regulated substance is suspected or confirmed, the owner or operator of a UST system which is temporarily out of service shall comply with all release reporting, investigation, and corrective action requirements in Subchapter D of this chapter (relating to Release Reporting and Corrective Action).

(2) Registration. At the time a UST system is temporarily taken out of service and at the time an UST system is brought back into service, the owner shall comply with the applicable tank registration requirements in §334.7 of this title (related to Registration).

(3) Fees. A UST which is temporarily out of service in accordance with this section shall remain subject to the commission's UST fees in Subchapter B of this chapter (relating to Underground Storage Tank Fees).

(4) Recordkeeping for temporary removal from service.

(A) Owners and operators shall maintain records adequate to demonstrate compliance with the requirements in this section, in accordance with §334.10(b) of this title (relating to Reporting and Recordkeeping).

(B) At a minimum, the following records shall be maintained for at least five years after the UST system is temporarily removed from service:

- (i) date that the UST system was temporarily removed from service;
- (ii) name, address, and telephone number of the person who prepared the UST system for the period of non-use;
- (iii) documentation of the procedures used to prepare and empty the UST system;
- (iv) copies of all documentation relative to any requests and approvals of extensions of time;
- (v) name, address, and telephone number of the person who conducted the tank and piping tightness tests, prior to returning the UST system to service;
- (vi) results of any tank and piping tightness tests; and
- (vii) date that the UST system was returned to service.

§334.55. Permanent Removal from Service.

(a) General provisions.

(1) Any owner or operator who intends to permanently remove an underground storage tank (UST) from service (by either removing the tank from the ground, abandoning the tank in-place, or conducting a permanent change-in-service) shall provide prior notice of this activity to the executive director in accordance with §334.6 of this title (relating to Construction Notification).

(2) The procedures used in permanently removing the UST from service shall conform with accepted industry practices, and shall be in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory.

(3) The permanent removal from service shall be conducted by qualified personnel possessing the appropriate skills, experience, competence, and, if applicable, any required license or certification to complete the activity in accordance with the provisions of this section and in a manner designed to minimize the possibility of any threats to human health and safety or the environment.

(4) All USTs that are intended for permanent removal from service shall be emptied of all regulated substances and accumulated sludges or residues, and shall be purged of all residual vapors in accordance with accepted industry procedures commonly employed for the stored regulated substance.

(5) The handling, transportation, and disposal of any regulated substances removed from a UST system, and any contaminated soils, backfill material, groundwater, wash water, or other similar materials removed from the system or facility, shall be conducted in a safe and environmentally sound manner, and shall be in accordance with all applicable federal, state, and local regulations in effect for the type, volume, contaminant concentration, and classification of the removed material.

(6) As part of the required procedure for the permanent removal of any UST system from service, the owner or operator shall determine whether or not any prior release of a stored regulated substance has occurred from the system.

(A) This determination shall be performed subsequent to the submittal of notification to the executive director as prescribed in §334.6 of this title (relating to Construction Notification), but prior to completion of the permanent removal from service.

(B) This determination shall be made by visual inspection of the area in and immediately surrounding the excavation zone for any above-ground releases and for any exposed below-ground releases, and by using one or both of the following methods or procedures:

(i) the continual operation (through the time that the stored regulated substances are removed from the UST system) of one or more of the external release monitoring and detection methods operating in accordance with §334.50(d)(5)-(9) of this title (relating to Release Detection); or

(ii) the performance of a comprehensive site assessment in accordance with the requirements of subsection (e) of this section.

(C) Any methods or procedures used to make this determination shall be capable of detecting any prior release of stored regulated substances from any portion of the UST system.

(D) Upon completion of this determination, the owner or operator shall:

(i) report any confirmed or suspected releases to the executive director and comply with all applicable release investigation and corrective action requirements, as prescribed in Subchapter D of this chapter (relating to Release Reporting and Corrective Action);

(ii) prepare or assemble the detailed written records of this determination, which shall include the methods, procedures, results, and names, addresses, and

telephone numbers of the persons involved in conducting such determination. Such records shall be maintained in accordance with the applicable provisions in subsection (f) of this section, and a copy of such records shall be filed with the commission in conjunction with the applicable tank registration requirements of §334.7 of this title (relating to Registration).

(7) For a UST to be considered permanently out of service, the owner or operator shall either remove the tank from the ground in accordance with subsection (b) of this section, abandon in-place and fill the tank with an acceptable solid inert material in accordance with subsection (c) of this section, or conduct a permanent change-in-service in accordance with subsection (d) of this section. Unused tanks (e.g., tanks at facilities which are closed or out of business) shall be considered temporarily out of service, and shall be subject to the provisions of §334.54 of this title (relating to Temporary Removal from Service), unless they have been permanently removed from service in accordance with this section.

(8) The requirements in this section are applicable to all USTs which are permanently removed from service on or after the effective date of this subchapter.

(9) For a UST permanently removed from service prior to the effective date of this subchapter, where the methods previously used for the release determination or the removal from service are unknown or are determined to have been inadequate, the executive director may require the owner or operator to conduct any or all of the following additional activities as appropriate:

(A) proper removal of the UST system from service, in accordance with the applicable provisions of this section;

(B) completion of a comprehensive site assessment, in accordance with the requirements of subsection (e) of this section;

(C) release reporting, investigation, and corrective action if a release of a regulated substance has occurred, in accordance with Subchapter D of this chapter (relating to Release Reporting and Corrective Action); and/or

(D) any other activities necessary to prevent any adverse impacts on human health and safety and the environment.

(b) Removal from the ground. In addition to the requirements of subsection (a) of this section, the following requirements shall be applicable for the removal of USTs from the ground.

(1) Except as provided under paragraph (2) of this subsection, tanks shall be properly emptied, cleaned, and purged of vapors prior to removal from the ground, in accordance with accepted industry procedures commonly employed for the stored regulated substance.

(2) When an owner or operator can demonstrate good cause for removal of a tank from the ground prior to emptying, cleaning, or purging the vapors, the owner or operator shall obtain approval from the manager of the appropriate district office (or the manager's designated representative) prior to proceeding with the removal. In this situation, the tank removal shall be accomplished only under the direct supervision of commission personnel and/or local fire officials, and all conditions and requirements imposed by such supervisory officials shall be strictly followed.

(3) Prior to removing the tank from the ground, all connected piping and other ancillary equipment shall be emptied, disconnected, and properly plugged, capped, or removed.

(4) Storage of removed tanks.

(A) After removal, a tank shall be transported from the site within 24 hours of removal, unless prior approval of a longer on-site storage period is obtained from the manager of the appropriate district office (or the manager's designated representative).

(B) The on-site storage of tanks for a period of 24 hours or less shall be in a designated temporary storage area which shall be an adequate distance from known ignition sources and which shall be clearly identified with appropriate barriers and warning signs to restrict access by unauthorized persons.

(C) On-site storage of removed tanks for more than 24 hours (when approved by the district manager), and off-site storage for any period, shall only be allowed in locked, securely fenced, or similarly restricted areas where unauthorized persons will not have access.

(D) No later than 24 hours after removal, all removed tanks (regardless of condition) shall be legibly and permanently labeled (in letters at least two inches high) with the name of the former contents, a flammability warning (if applicable), and a warning that the tank is unsuitable for the storage of drinking water or the storage of human or animal food products.

(E) The residual vapor levels in any removed tank which is stored at the UST facility shall be maintained at non-explosive and non-ignitable levels for the entire time that the tank remains at the facility.

(F) Regardless of where the tank is stored, not later than ten days after the tank has been removed from the ground, any residual liquids or vapors shall be permanently removed to render the tank non-ignitable and non-explosive.

(5) Transportation and disposal of removed tanks.

(A) The methods and procedures used for the handling, transporting, and disposing of any removed USTs (and parts of such tanks) shall be protective of human health and safety and the environment, and shall be in accordance with all applicable federal, state, and local regulations.

(B) Removed tanks (and any parts of such tanks) which have been emptied, thoroughly cleaned of all remaining substances and any remaining residues, and permanently purged of vapors may be appropriately disposed by scrapping, junking, or reusing for purposes unrelated to the underground storage of regulated substances.

(C) Prior to transporting any removed tank from the UST facility, the following minimum preparation procedures shall be followed.

(i) The remaining regulated substances shall be removed, and visible residues or sediments shall be cleaned from the tank as completely as possible, in accordance with commonly-used and accepted industry practices.

(ii) Residual vapor levels in the tank shall be reduced to non-explosive and non-ignitable levels, and shall be maintained at such levels during the entire period of transportation.

(iii) All holes and openings shall be properly plugged or capped, except for one 1/8-inch diameter vent hole positioned at the top of the tank during transportation.

(D) The subsequent reuse of any removed tanks for the underground storage of regulated substances (whether on-site or off-site) shall only be allowed under the provisions of §334.53 of this title (relating to Reuse of Used Tanks).

(6) The tank owner shall develop and maintain a permanent record of the prior location of the removed tank, the date of removal, the substance previously stored, the method of conditioning the tank for removal, the methods of handling, transportation, storing, and disposing of the tank, the names, addresses, and telephone numbers of the person conducting the activities, and any information regarding any known releases from such tank. If the facility owner is not the same person as the tank owner, the tank owner shall provide a copy of such information to the site or facility owner within 30 days after the date of removal.

(c) Abandonment in-place. A UST may be permanently removed from service by abandonment in-place in lieu of actual removal from the ground. In addition to the requirements of subsection (a) of this section, the following requirements shall be applicable to the abandonment in-place of USTs.

(1) When the UST owner is not the owner of the site or facility where such tank is located, the tank owner is prohibited from abandoning such tank in-place unless the following conditions are met.

(A) The tank owner shall provide written notice to the owner of the site or facility for the abandonment in-place prior to initiating the activity.

(B) After completion of the abandonment in-place, the tank owner shall provide to the site or facility owner a legible copy of the permanent record of the abandonment, as described in paragraph (3) of this subsection.

(2) Any tank that is abandoned in-place shall be filled with a solid inert material as prescribed in this paragraph.

(A) Only solid inert materials which are free of any harmful contaminants or pollutants shall be used to fill the tank. Acceptable materials include sand, fine gravel, sand and gravel mixtures, and cement/concrete-based slurries. Other materials such as native soils, drilling muds, and commercially-marketed fill materials shall not be used for filling the tank unless the material and filling procedures have been reviewed and approved by the executive director in accordance with §334.43 of this title (relating to Variances and Alternative Procedures).

(B) Adequate access openings shall be made in the top of the tank, and the tank shall be filled as completely as possible. Voids and air pockets shall be eliminated.

(C) The fill material and filling procedures shall be adequate to assure that:

(i) the filled tank will not surface after completion of the filling operation;

(ii) any settling or instability of the ground surface subsequent to the abandonment in-place is minimized or eliminated;

(iii) the fill materials will form a permanent solid inert filler that can be expected to remain structurally stable in the ground to prevent cave-ins, even after the subsequent deterioration of the tank walls; and

(iv) the filled tank and associated piping are disconnected and capped or sealed so as to preclude their future use for any storage or disposal purposes.

(3) The tank owner shall develop and maintain a permanent record of the name and address of the tank owner (and site or facility owner, if different), the abandoned tank location, the date of abandonment, the substance previously stored, the method of conditioning the tank for abandonment, release assessment results, the names, addresses, and telephone numbers of the persons conducting the activities, and information regarding the extent of any confirmed releases and any resulting remediation activities.

(A) When the tank owner is not the owner of the facility where the tank is located, the tank owner shall provide to the current facility owner a legible copy of the permanent record of the abandonment in-place. Such information shall be provided no later than 30 days after completion of the abandonment in-place.

(B) The facility owner shall maintain a permanent record of the tank abandonment in-place in accordance with subsection (f) of this section.

(C) Prior to the sale or conveyance of the facility where an abandoned UST is located, the facility owner shall provide written documentation of the tank abandonment information to the succeeding property owner.

(d) Change-in-service. In addition to the requirements of subsection (a) of this section, the following requirements shall be applicable for any change-in-service where a UST system storing regulated substances is converted to a system storing materials other than regulated substances.

(1) Prior to refilling with materials other than regulated substances, the UST shall be properly emptied, cleaned, and purged of vapors in accordance with a code or standard of practice developed by a nationally recognized association or independent testing laboratory for the stored regulated substance. The procedures for emptying, cleaning, and purging the UST shall be designed to remove as much as possible of the previously stored regulated substances, including all liquids, vapors, sludges, and residues, in a manner that is protective of human health and safety or the environment.

(2) A change-in-service where a UST storing regulated substances is to be converted for the storage of either drinking water or food products intended for human consumption is specifically prohibited.

(3) Any change-in-service shall be in accordance with all applicable federal, state, and local regulations.

(4) The owner shall develop and maintain a permanent record of the location of the UST, the date of the change-in-service, the regulated substance previously stored, the method of conditioning the tank for the change-in-service, the names, addresses, and telephone numbers of the persons conducting the activities, and any information regarding any known releases of regulated substances from such tank. If the facility owner is not the same person as the UST owner, the UST owner shall provide a copy of such information to the facility owner within 30 days after the date of the change-in-service.

(5) For the purposes of this section, a UST which has been converted to the storage of materials other than regulated substances (e.g., water) shall be subject to the procedures for temporary removal from service in §334.54 of this title (relating to Temporary Removal from Service), except when the stored materials are utilized on a regular basis for beneficial purposes.

(e) Site assessment.

(1) A comprehensive site assessment meeting the requirements of this subsection shall be performed by the owner or operator of an UST system in the following situations to determine whether or not a release has occurred:

(A) when the site assessment is selected as the method to achieve compliance with the release determination requirements of subsection (a)(6) of this section for a UST which is permanently removed from service on or after the effective date of this subchapter;

(B) when an owner or operator requests an extension of time to allow a UST system to remain temporarily out of service beyond the prescribed time limits, as provided in §334.54(d)(2)(B) of this title (relating to Temporary Removal from Service);

(C) when the executive director determines that a comprehensive site assessment is necessary at a site or facility where a UST was permanently removed from service prior to the effective date of this subchapter, and where the site assessment or release determination at the time of removal from service was determined to be either non-existent or inadequate; or

(D) when the executive director or the commission determines that a comprehensive site assessment is necessary at any site or facility where a release or suspected release may pose a current or potential threat to human health or safety or the environment.

(2) The site assessment shall be conducted by qualified personnel possessing the appropriate skills, experience, and competence to perform the assessment in accordance with recognized industry practices and the provisions of this section.

(3) Any procedures used for the site assessment must be capable of measuring for the presence of a release from any part of the UST system and, at a minimum, must include measurements for releases at locations where contamination is most likely to be present at the site.

(4) The owner or operator shall assure that in selecting the sampling or measurement methods, the sample types, and the sampling or measurement locations, the persons conducting the assessment shall take into consideration the following factors to ensure that the presence of any released regulated substances is detected and quantified:

(A) the specific method of removing the UST system from service;

(B) the nature and composition of the stored regulated substance;

(C) the type and characteristics of the backfill material and surrounding soils;

(D) the presence of groundwater, and its depth with relation to the UST system and the surface of the ground; and

(E) any other factors that may affect the reliability or effectiveness of the site assessment procedures or techniques.

(5) One or more of the following methods may be used for conducting the site assessment and release determination required under this section, provided that such methods are in compliance with the performance standards in paragraphs (2), (3), and (4) of this subsection:

(A) collection and analysis of soil samples secured from unsaturated sections of the UST system excavation zone and surrounding soils, where such samples shall be analyzed for major constituents and/or indicator parameters of the stored regulated substance(s);

(B) collection and analysis of groundwater samples secured from the UST system excavation zone and surrounding area, where such samples shall be analyzed for all major constituents or indicator parameters of the stored regulated substance(s); and/or

(C) any other site assessment or release determination method or procedure which has been reviewed and determined by the executive director to detect prior releases of the stored regulated substance(s) in a manner that is no less protective of human health and the environment than the methods described in subparagraphs (A) and (B) of this paragraph, as provided under §334.43 of this title (relating to Variances and Alternative Procedures).

(f) Records for permanent removal from service.

(1) Owners and operators shall maintain records adequate to demonstrate compliance with the requirements of this section, in accordance with §334.10(b) of this title (relating to Reporting and Recordkeeping).

(2) At a minimum, the following records shall be maintained for as long as any UST remains in service at the facility, or for five years after the UST system is permanently removed from service, whichever is longer:

(A) records of the release determination or site assessment, in accordance with the requirements in subsection (a)(6)(D)(ii) of this section;

(B) records related to the tank removal procedures (as applicable), in accordance with the requirements in subsection (b)(6) of this section;

(C) records related to the abandonment in-place of an UST system (as applicable), in accordance with the requirements in subsection (c)(4) of this section; and

(D) records related to the change-in-service of an UST system (as applicable), in accordance with the requirement in subsection (d)(4) of this section.

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